N260
Installation and Operations Manual

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CONVERTIBLE ENCLOSURE MOUNTING DIMENSIONS

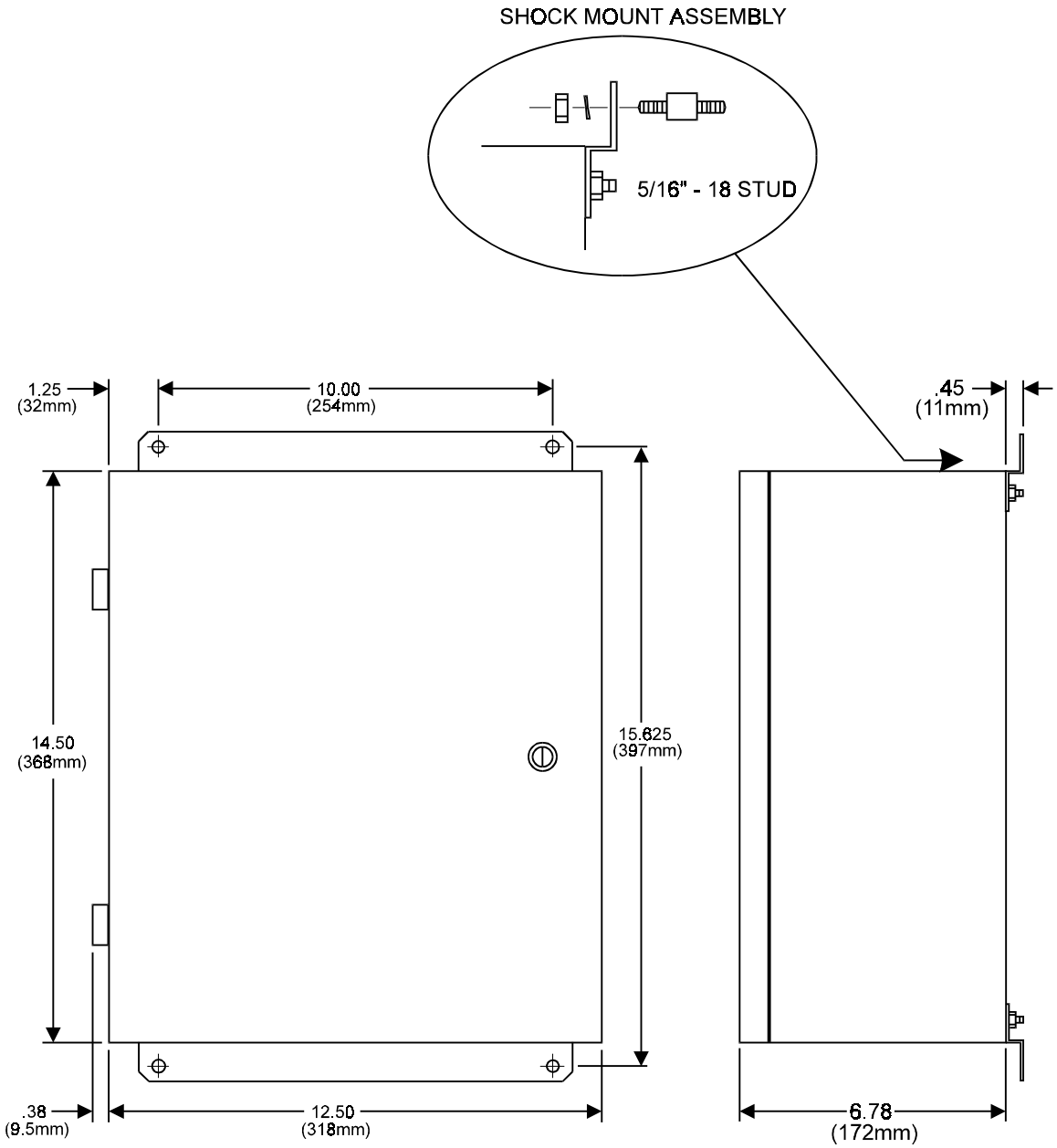


FIGURE 1

N260C FLUSHMOUNT
MOUNTING DIMENSIONS

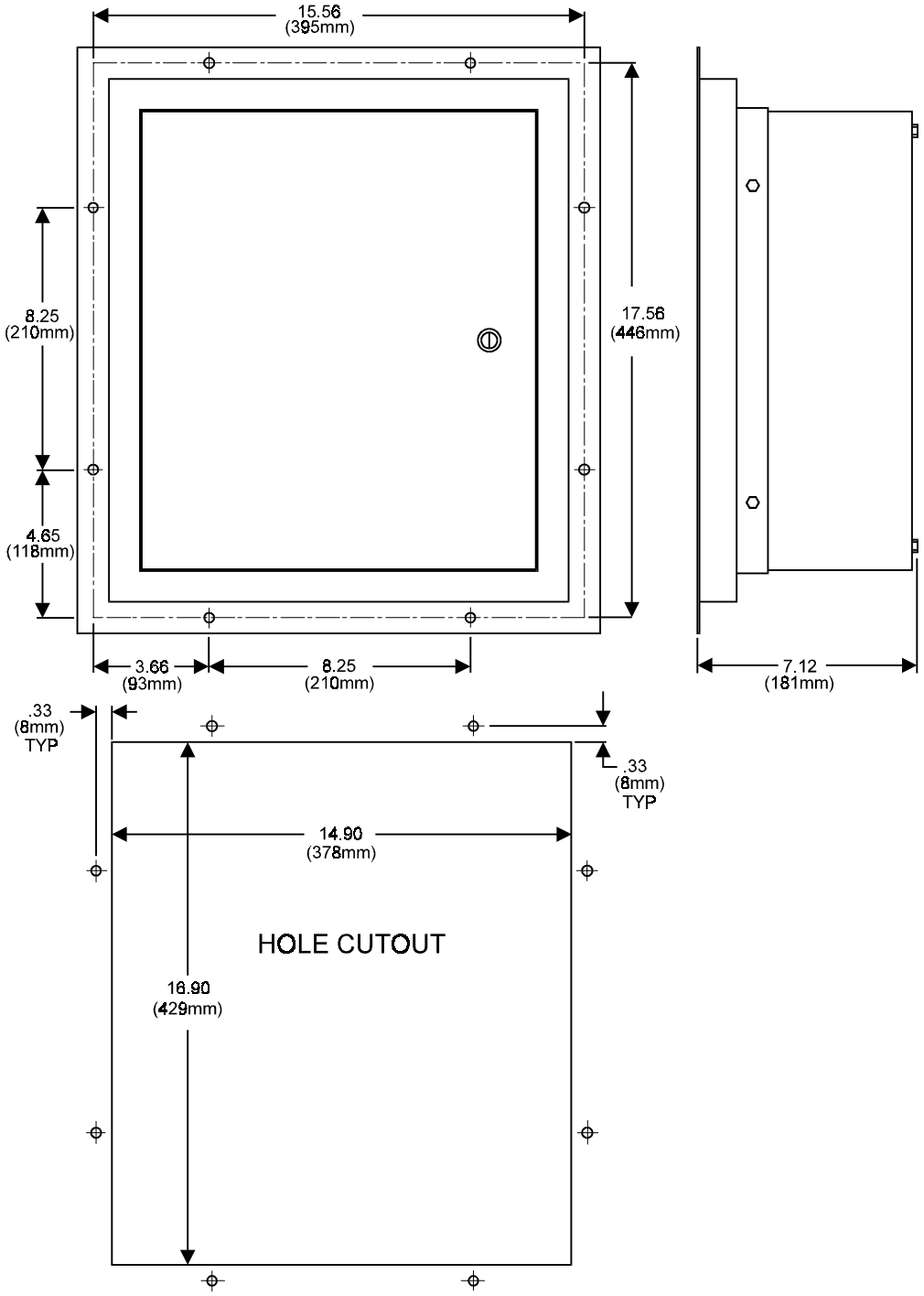


FIGURE 2

N260 - AC POWER, RELAYS AND PROBE HOOK-UP

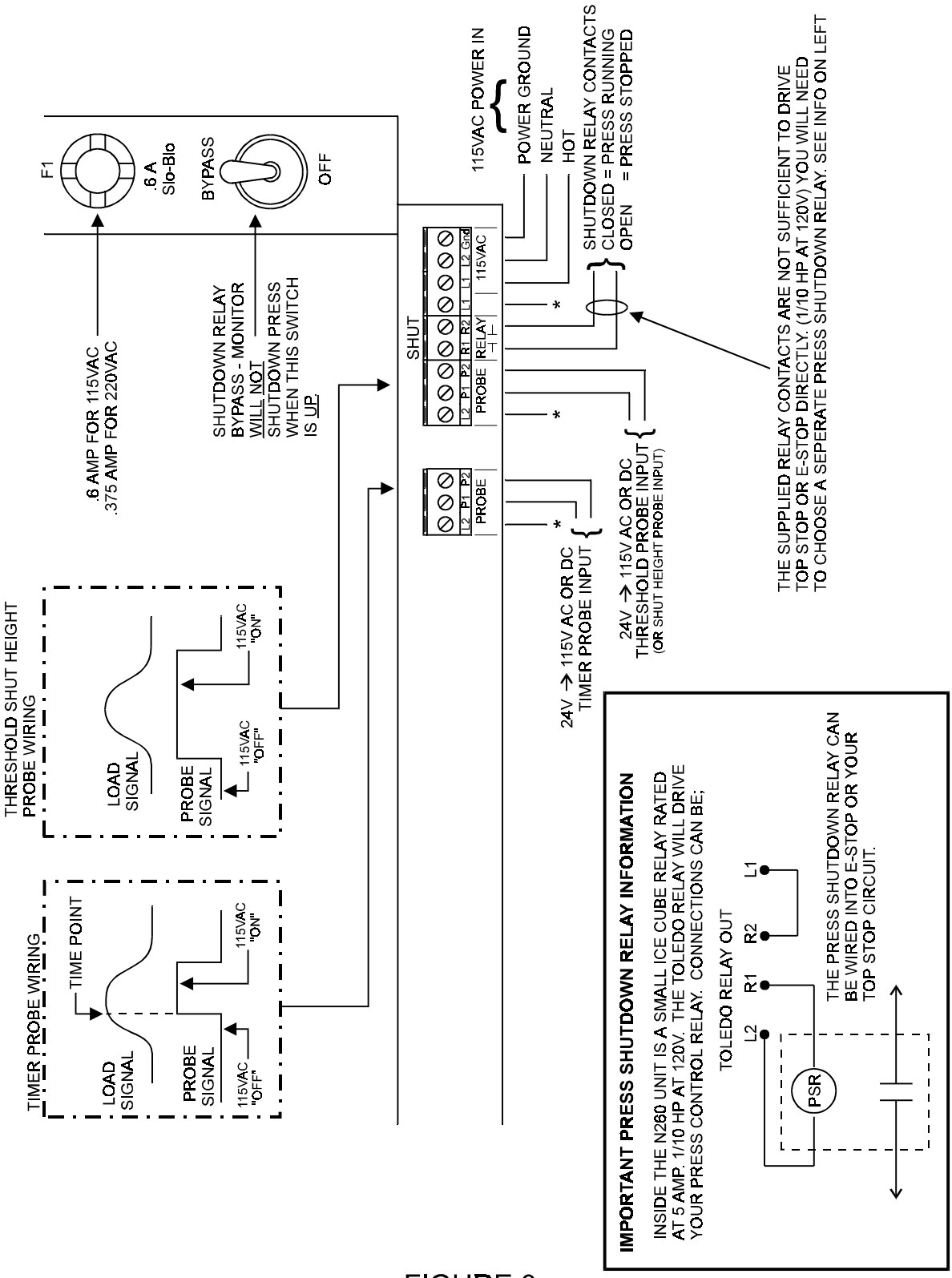


FIGURE 3

SENSOR AND RESOLVER HOOKUP - RV6 & RV7

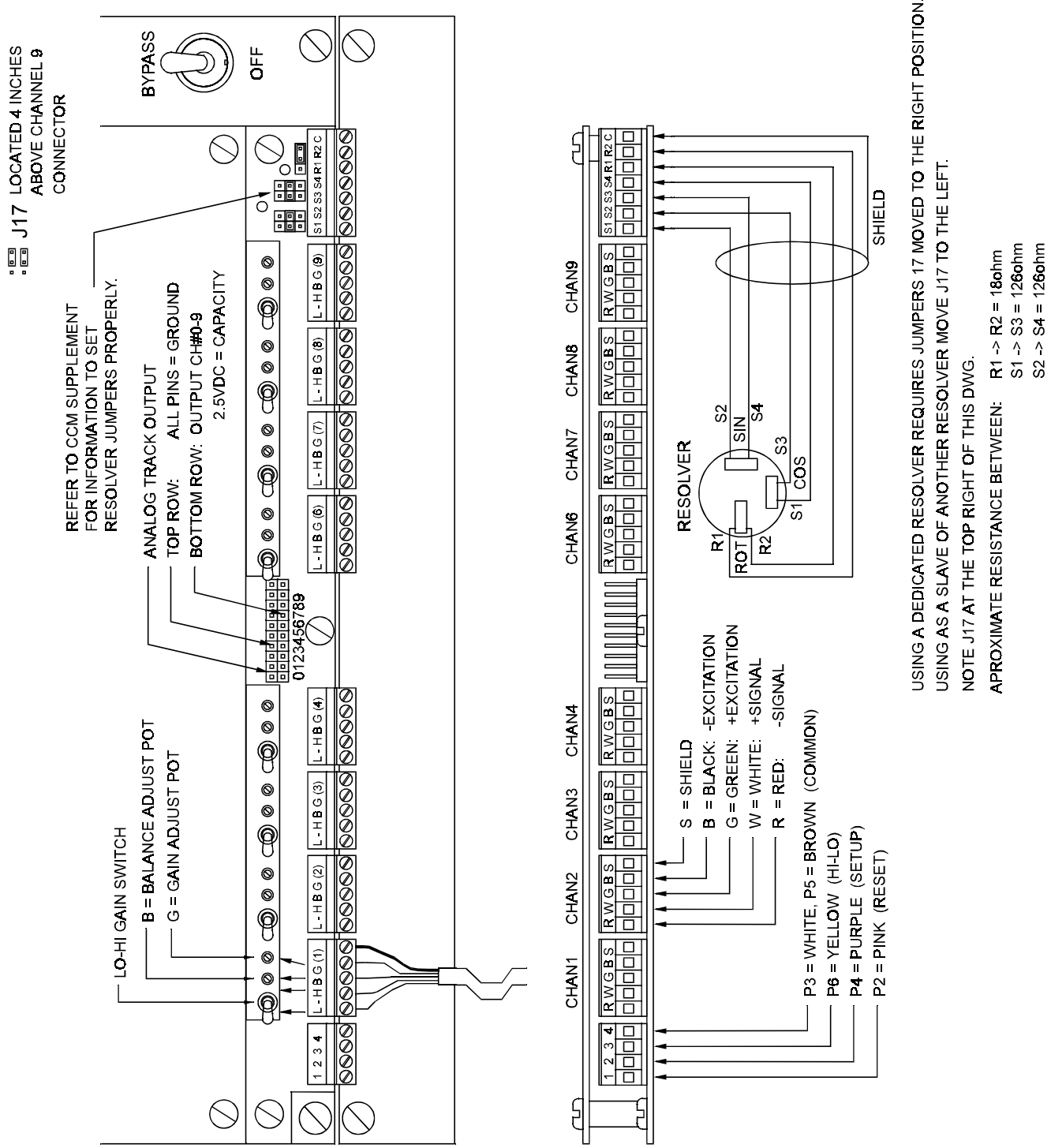
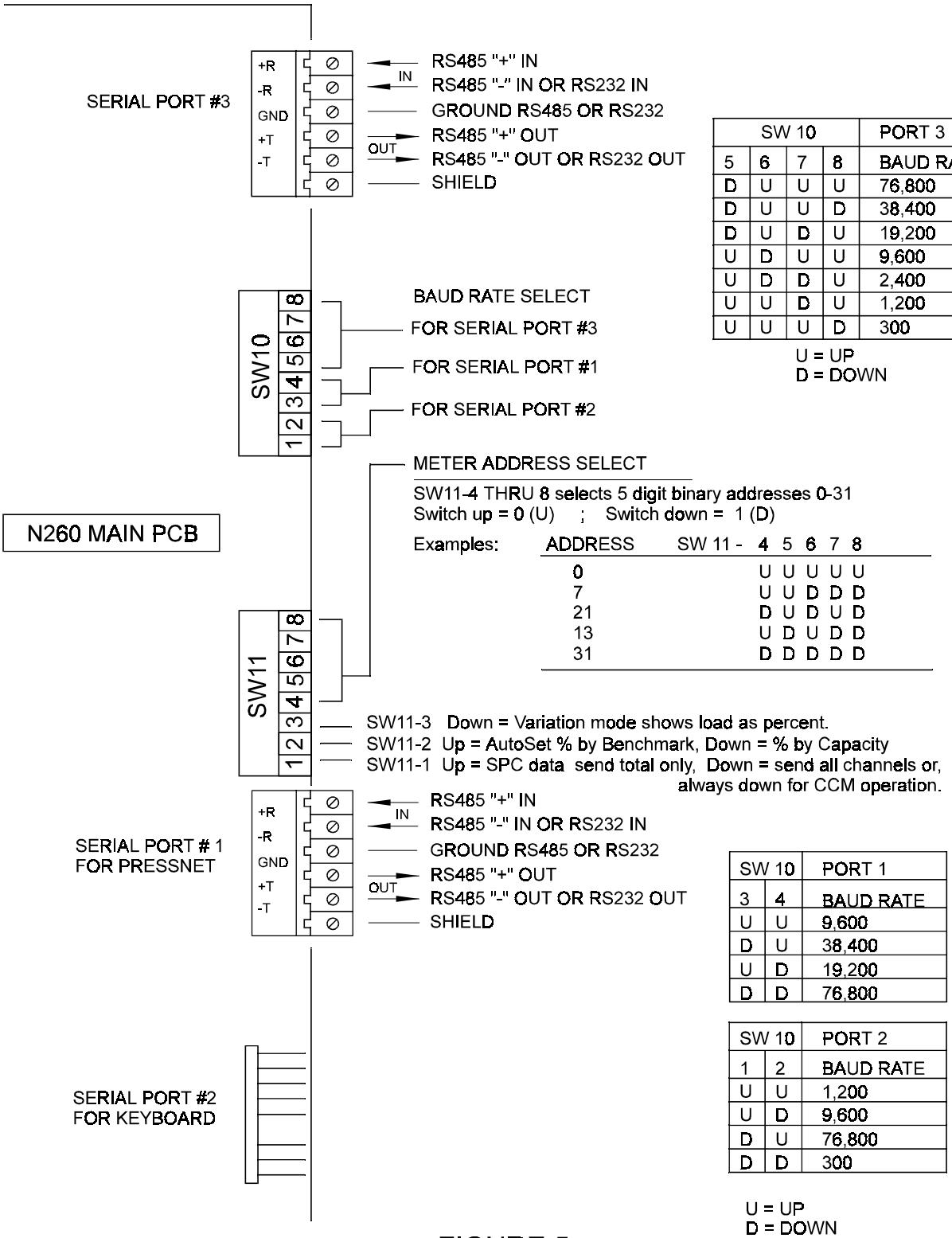


FIGURE 4

MAIN PC COMPUTER I/F HOOKUP AND SWITCHES - RV6



SW 10				PORT 3
5	6	7	8	BAUD RATE
D	U	U	U	76,800
D	U	U	D	38,400
D	U	D	U	19,200
U	D	U	U	9,600
U	D	D	U	2,400
U	U	D	U	1,200
U	U	U	D	300

U = UP
D = DOWN

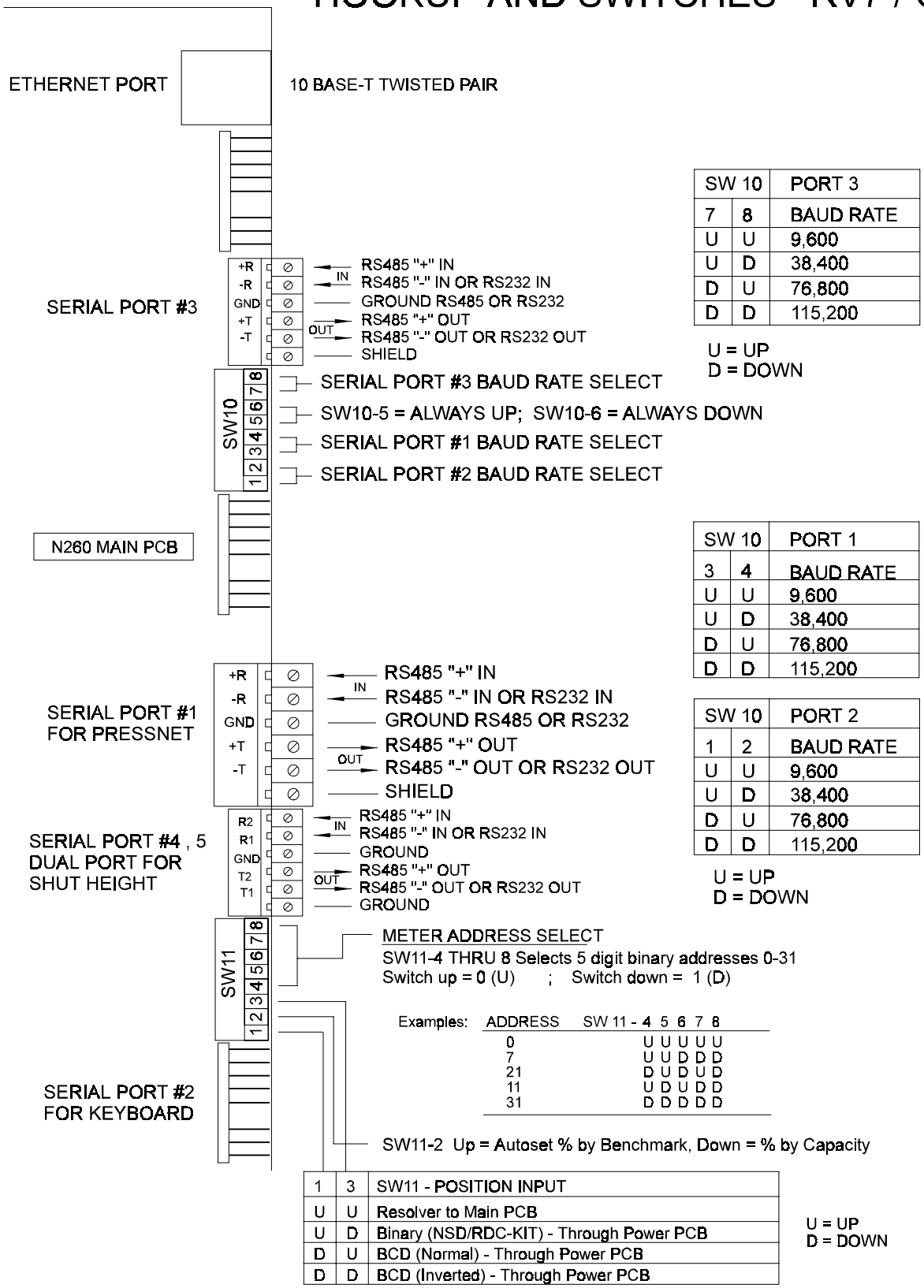
SW 10		PORT 1
3	4	BAUD RATE
U	U	9,600
D	U	38,400
U	D	19,200
D	D	76,800

SW 10		PORT 2
1	2	BAUD RATE
U	U	1,200
U	D	9,600
D	U	76,800
D	D	300

U = UP
D = DOWN

FIGURE 5

N260 MAIN PC COMPUTER I/F
HOOKUP AND SWITCHES - RV7 / CCM



SW 10		PORT 3
7	8	BAUD RATE
U	U	9,600
U	D	38,400
D	U	76,800
D	D	115,200

U = UP
D = DOWN

SW 10		PORT 1
3	4	BAUD RATE
U	U	9,600
U	D	38,400
D	U	76,800
D	D	115,200

SW 10		PORT 2
1	2	BAUD RATE
U	U	9,600
U	D	38,400
D	U	76,800
D	D	115,200

U = UP
D = DOWN

1	3	SW11 - POSITION INPUT
U	U	Resolver to Main PCB
U	D	Binary (NSD/RDC-KIT) - Through Power PCB
D	U	BCD (Normal) - Through Power PCB
D	D	BCD (Inverted) - Through Power PCB

U = UP
D = DOWN

FIGURE 6

N260 FRONT PANEL

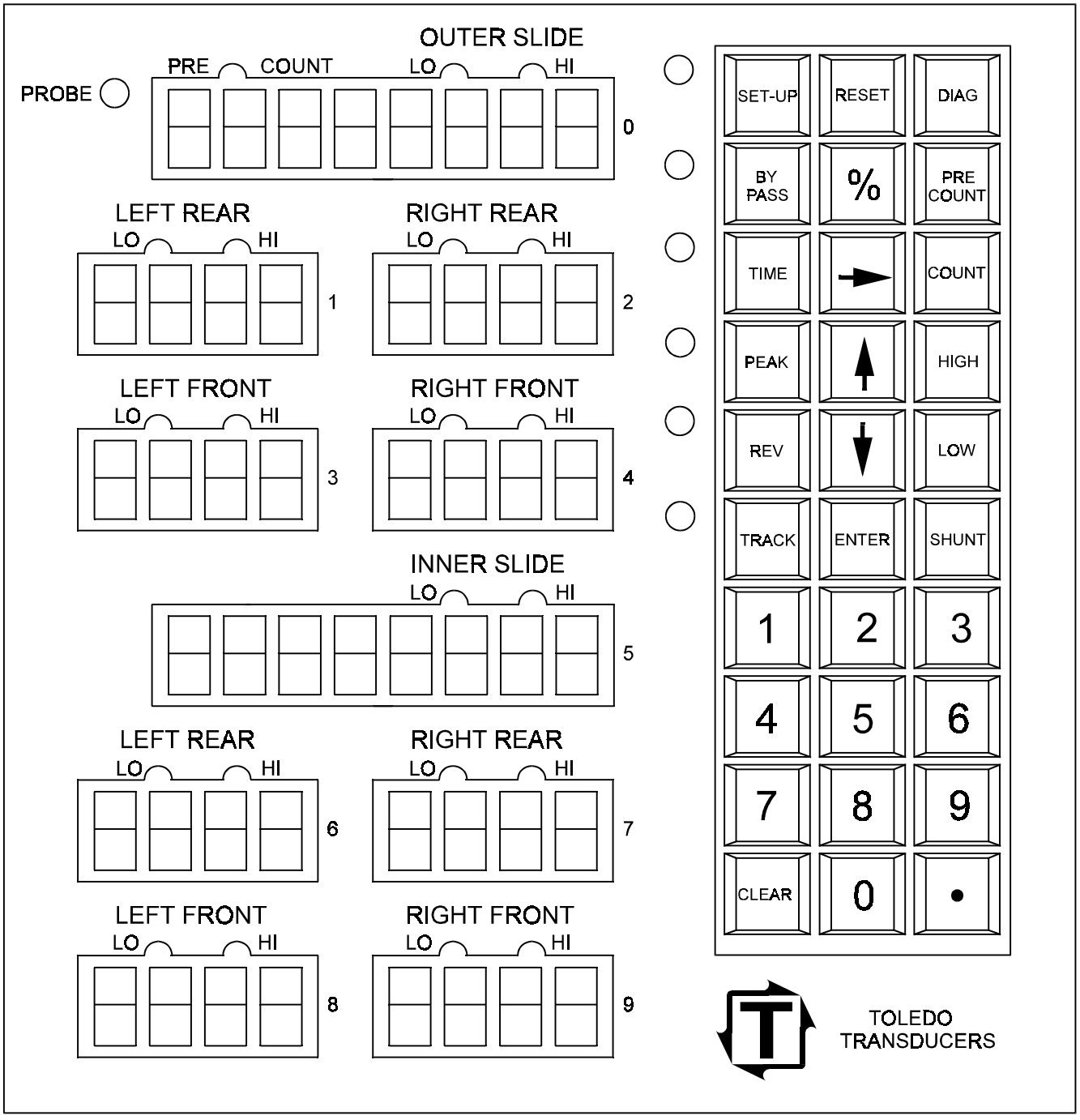
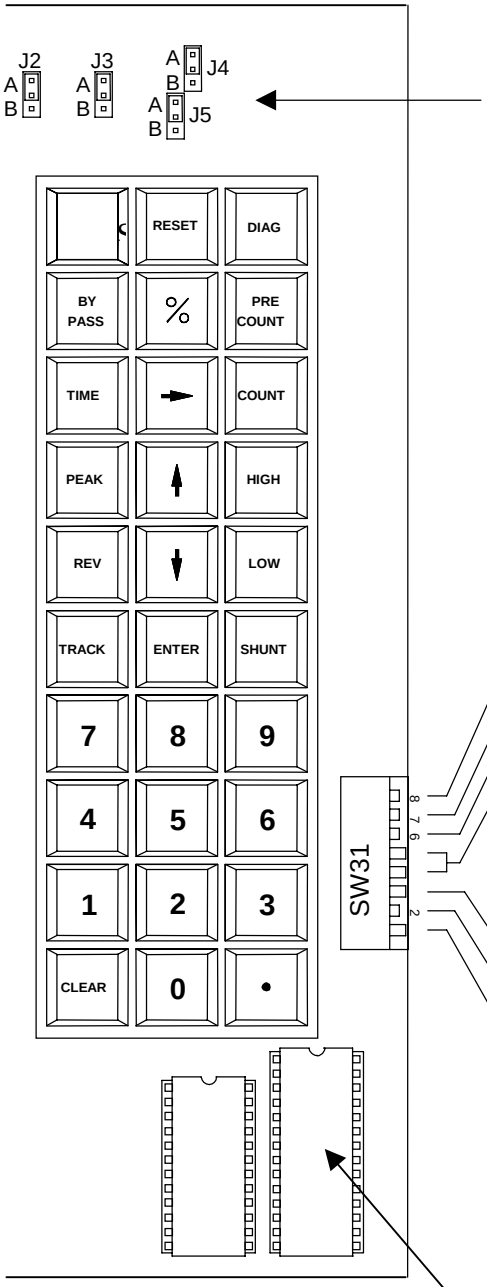


FIGURE 7

KEYBOARD JUMPERS AND SWITCHES



J2, J3, J4 AND J5 SHOULD ALWAYS BE IN THE "A" (UPPER) POSITION.

SW31 DESCRIPTION

- #8 – CAPACITY ENTRY, SEE BELOW
- #7 – NO FUNCTION, ALWAYS UP (OPEN)
- #6 – MASTER RESET, NORMALY UP (OPEN)
- #4 & #5 – BAUD RATE SELECT:

BAUD	#4	#5	
76,800	DOWN	DOWN	(DEFAULT)
9,600	DOWN	UP	
1,200	UP	DOWN	
300	UP	UP	

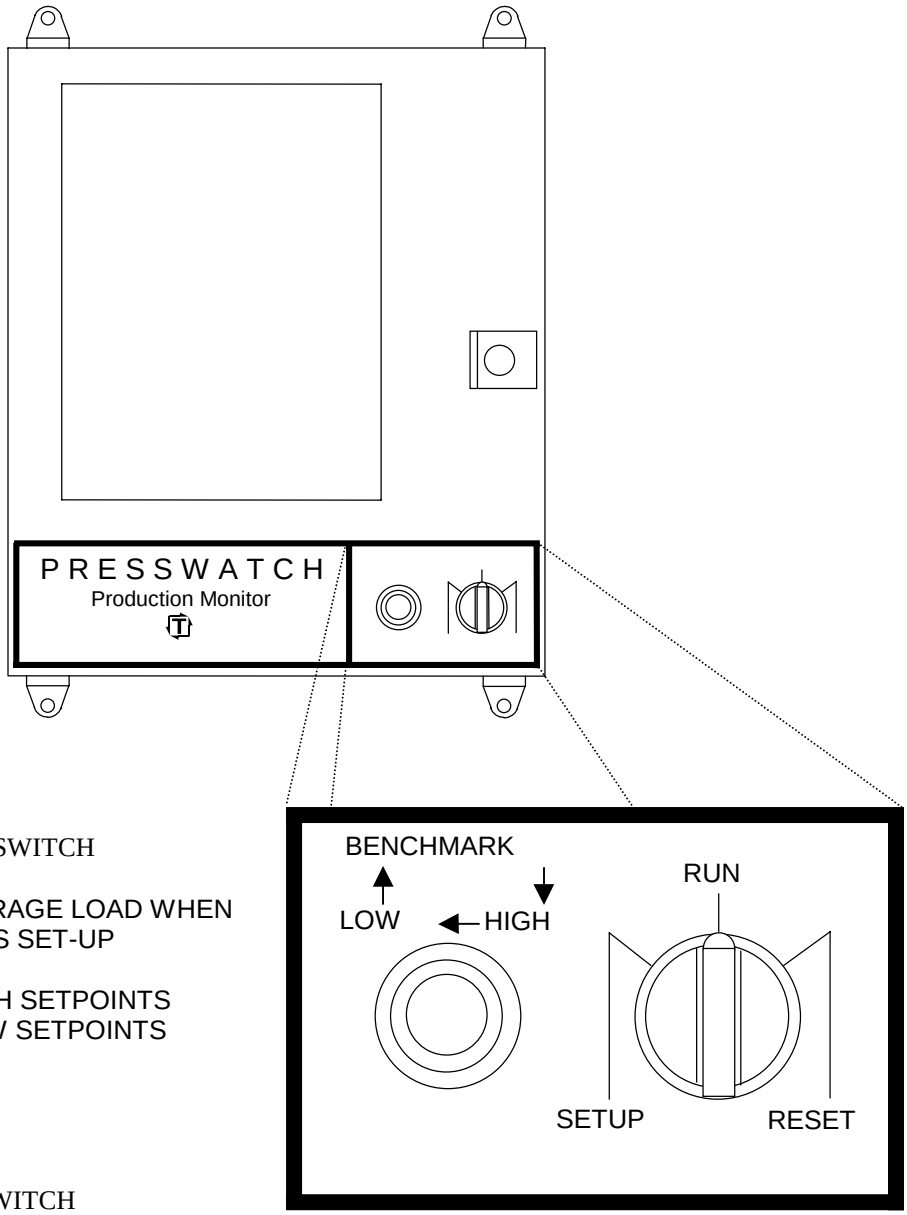
- #3 – ALWAYS DOWN (CLOSED)
- #2 – ALWAYS UP (OPEN)
- #1 – ALWAYS DOWN (CLOSED)

TO CHANGE THE CAPACITY SETTING OR THE NUMBER OF DECIMAL POSITIONS TOGGLE SWITCH #8 DOWN AND THEN UP BEFORE PRESSING "ENTER"

KEYBOARD FIRMWARE

FIGURE 8

N260 FRONT DOOR CONTROLS



PUSHBUTTON SWITCH

BENCHMARK: AVERAGE LOAD WHEN JOB WAS SET-UP

HIGH: HIGH SETPOINTS
LOW: LOW SETPOINTS

SELECTOR SWITCH

TURNING SELECTOR SWITCH FROM “SET-UP” TO “RUN” CAUSES NEW BENCHMARK AND NEW SETPOINTS TO BE ESTABLISHED AFTER 8 CYCLES.

RESET: CLOSE RELAY, CLEAR ALARMS

RUN: NORMAL MODE FOR RUNNING A JOB

SET-UP: HIGH AND LOW SETPOINTS ARE NOT ACTIVE; USE THIS MODE FOR SETTING UP A JOB

FIGURE 9

N260 OPERATORS GUIDE

TURN ON POWER - The first time power is applied all values are set to 0.0 except for the following:

CAPACITY	= 100.0 each chan	THRESHOLD	= 6.3 chan 0
HIGH SETPOINT	= 100.0 each chan	COUNT HIGH SET	= 200.0 chan 0
LOWEST LOAD	= 100.0 each chan	OPERATING MODE	= PEAK mode
PRESET COUNTERS	= 1 each chan	% SETTINGS	= 20% each chan

ENTERING DECIMAL POINT and CAPACITY (Only necessary at 1st power-up)
Dec Point = press **HIGH HIGH HIGH pt. (up or dn) (dipswitch SW31-8) ENTER**
Capacity = press **HIGH HIGH HIGH pt. (0-9) (value) (dipswitch SW31-8) ENTER**

CHECKING CALIBRATION NUMBERS - (Sensorsl must be connected)

1. press **TRACK** (Track LED comes on, peak LED goes off)
2. Zero each channel (1-4, 6-9) by adjusting BALANCE pot
3. press **SHUNT** (S appears in ch. 0, cal nos. appear in chans. 1-4, 6-9)
4. Adjust GAIN pot chs. 1-4,6-9 to get proper cal nos. if not correct.
   If the number will not go high enough switch to HIGH GAIN.
5. press **SHUNT** (S gone, ch. 1-4, 6-9 = 0. If not = 0, repeat steps 2-5)

OPERATING MODES - press **PEAK** (Peak LED comes on, track LED goes off)

SETUP MODE - press **SETUP SETUP** - LED toggles on/off - if on, in SETUP mode
REVERSE MODE - press **REV** - LED toggles on/off - if on, in REVERSE mode
AUTOSET or AVERAGE TONNAGE DISPLAY - press **LOW COUNT pt. (up or dn) ENTER**
0 = normal, 1= average of 16 hits, 2 = AUTOSET mode (L displayed)
TIME MODES - press **TIME TIME** - LED toggles on/off - LED on = TIME mode
to change the TIME mode press **TIME pt. (up or dn) ENTER**
0 = B4, 1 = FIRST LEVEL, 2 = SECOND LEVEL, 3 = POINT-IN-TIME

SETPOINT DATA	To display press:	To change press:
% SETTINGS	**% HIGH or LOW** - - - - - - - -	**(arrow) or CHAN # (arrow) ENTER**
HIGH SETPOINTS	**RESET HIGH** - - - - - - - - - -	**CHAN # (value) ENTER**
LOW SETPOINTS	**RESET LOW** - - - - - - - - - -	**CHAN # (value) ENTER**
PRESET COUNTERS	**PRECOUNT COUNT** - - - - -	**CHAN # (any arrow) ENTER**
TIME VALUE	**RESET TIME** - - - - - - - - - - -	**0 (value) ENTER**
BATCH COUNTER	**RESET PRECOUNT** - - - - - -	**(value) ENTER**
THRESHOLD	**LOW LOW LOW** - - - - - - - -	**0 (value) ENTER**
COUNT HI SETPOINT	**HIGH COUNT** - - - - - - - - - -	**0 (value) ENTER**
COUNT LO SETPOINT	**LOW COUNT** - - - - - - - - - -	**0 (value) ENTER**

COUNT & TIME DATA	To display press:	TONNAGE DATA	To display press:
COUNT	**RESET COUNT**	LAST ALARM	**HIGH LOW**
HI COUNTS	**COUNT HIGH**	LAST HIGH ALARM	**HIGH TIME**
LO COUNTS	**COUNT LOW**	LAST LOW ALARM	**LOW TIME**
RATE in SPM	**COUNT TIME**	HIGHEST LOAD	**RESET HIGH HIGH**
DOWNTIME	**TIME COUNT**	LOWEST LOAD	**RESET LOW LOW**

TO CHANGE MAX CHANNEL DISPLAY press **LOW LOW LOW pt. (up or dn) ENTER**
RESETTING ALARMS - press **RESET RESET RESET**
CLEARING ANY DATA - press **CLEAR** - clears display to zero
CLEAR MEMORY - press and hold **CLEAR** - then press **RESET RESET RESET**
DIAGNOSTICS - each time **DIAG** is pressed new diagnostic info is shown
when # = 0, software ROM version is displayed
when # = 1, battery voltage is displayed

I. GENERAL DESCRIPTION

The N260 Presswatch Production Monitor is used to monitor the peak load on a press or other machine with intermittent loading. Up to 8 channels of sensor input may be connected to the N260 monitor. Two additional channels display the total load of 4 inputs each, giving the instrument a maximum of 10 displays. In its maximum configuration (N268) the monitor displays the total and distribution load for both the inner and outer slides of a double acting press. The N260 also comes as an N266 (6 channels), an N264 (4 channels) or an N262 (2 channels). Custom versions with odd numbers of channels are also available.

The monitor displays the peak load in each channel at the end of each press stroke. Each channel has a high and a low setpoint to form a quality window for acceptable load. Load values outside this window in any channel cause a relay to open to shut down the press. The display shows the out of tolerance load and in which channel it occurred.

An automatic "Auto-set" feature is available to set the high and low setpoints automatically based on a % deviation from the average load. Typically the setup person would set the job properly with the N260 in the Setup. Capacity overload protection is maintained while in Setup. When the job is set right, the keyswitch is moved from Setup to Run. The N260 uses the next eight machine cycles to determine the average load and then sets the high and low setpoints as a percentage deviation from this benchmark (average). The percentage may be set to a value from 2% to 45%. Each channel's high and low setpoint percentages may be set independently. A pushbutton on the front of the N260 allows the operator to see the benchmark (average) load, high setpoints, or low setpoints.

When Auto-set is used, the Variation display may also be selected. With the Variation display selected, the N260 shows the actual load only while in Setup. As soon as the job is set and the N260 has "learned", the display shows the percentage deviation + and - from the benchmark (average) value. For example, if the benchmark value for a channel is 100 tons and on the next stroke the load was 103 tons, the display would show 3.0%. Likewise if the following load was 95 tons the display would show -5.0%. With Variation displayed, when the pushbutton on the front of the N260 is used to show the setpoints, the high and low setpoints are shown as percentages. The benchmark is always displayed as a load value.

A number of other operating modes may be selected in addition to the peak mode. The load may be read at a point in time, or the peak load read either before or after this point in time. A special "B4" mode may be selected which reads the distribution load of the outer slide and the peak load of the inner and outer combined on a double action press when using the N264. The average load for the last 16 strokes may be read for any of the above operating modes if the N260 is in Manual (Auto-set not activated). Finally, a reverse mode is provided to display the snap-through load, which occurs in blanking operations.

Many different counts are provided. A stroke counter counts each press stroke up to a maximum of 99,999,999. A pre-determined batch counter can be set to stop the machine at the end of a run. This counter is also 8 digits. Each channel has a high and low alarm counter which keeps track of the out of tolerance loads (up to 9,999).

The monitor also keeps track of the downtime, the press speed (in SPM), and the highest and lowest load in each channel.

Each display is a 4 digit display and each channel has a resolution of one part in 1024. The N261 can monitor presses at speeds of up to 3000 SPM. The N262 can monitor presses at up to 1500 SPM. An N264 can run at up to 800 SPM and the N268 handles up to 400 SPM. By changing the number of channels processed internally, an N264 can be made to run at high speeds with a simple keyboard command. This allows for much flexibility. For example, an N264 can be setup to monitor a press with 4 sensors at a speed of 3000 SPM if only the total load is displayed.

Another feature is the automatic Die Memory. The N260 can remember the settings for up to 100 different dies. These settings are stored in a non-volatile EEPROM and called up with a 00-99 program number. When Autoset is activated, the benchmark is also retained to make setting up the same job again easier.

All setup parameters are stored in EEPROM and counts are stored in a battery backed up memory which will hold the data for years. A diagnostic routine indicates when the battery needs to be replaced. The diagnostics also indicate probe and relay status in addition to the software version number.

Normally the load must go above some minimum value before monitoring occurs. This value is called the threshold. The threshold senses the beginning of a load cycle. Alternately a probe may be used to activate the monitor at the beginning of a cycle.

The Time modes available in the N260 use a point in the stroke to trigger special functions. Where this point occurs is normally determined by a time delay starting at the threshold crossing. This delay is called the Time Value. Another way to define this time point is by using a second probe.

The N260 accepts as inputs from these probes any AC or DC voltage between 24 and 115 volts. A voltage present at the input indicates probe "on". Zero voltage at the input indicates probe "off".

The N260 also has a built in high speed computer interface. RS232 or RS422/RS485 can be chosen with speeds selectable from 300 to 76,800 baud. When using the RS422/RS485 interface up to 32 N260s may be daisy chained on the same twisted pair cable. In this configuration each monitor has a unique address which the computer uses to talk to them one at a time. The computer can do remotely anything that an operator can do at the N260 keyboard. Information can be fully up or downloaded to and from the computer.

II. OPERATION

A. USING THE N260 IN AUTO-SET - Refer to Figure 9

1. SETTING UP THE DIE

Normally a number of parts must be made as the ram is adjusted to get good parts. The keyswitch on the face of the N260 should be set to SETUP during the die set operation. The N260 will alarm and cause a shutdown if press capacity is exceeded either in the total or in a corner at any time during the die setting operation. If such an alarm occurs, turn the keyswitch to the RESET position to clear the alarm. Then turn the keyswitch back to the SETUP position. Once the die is set and good parts are being made, go on to step 2.

2. ESTABLISHING THE BENCHMARK USING "LEARN"

Once good parts are being made, turn the keyswitch on the N260 door face to the RUN position. The N260 will remain in SETUP (SETUP LED on) for the next 8 press cycles while it "learns" the average. At the end of these 8 cycles, the BENCHMARK becomes the average of these 8 cycles. The HIGH and LOW setpoints are now changed to values, which are a percentage above, and below this BENCHMARK. This percentage is determined by the % settings (at initial power-up these are 20%). We have just caused the N260 to "learn" new setpoint values. Anytime the keyswitch is moved from the SETUP position to the RUN position and eight press cycles occur, the N260 "learns" again and new HIGH and LOW setpoints are established.

3. NORMAL LOAD DISPLAY

a. LOAD VALUES

If the N260 is in SETUP, the display will show the actual load in each channel in units based on the machine capacity. If the capacity is in tons, the display shows tons. If the capacity is in pounds, the display shows pounds. At the end of the "learn" operation when the N260 exits SETUP (SETUP LED goes off), the display will continue to show the load in these units unless the VARIATION display is selected.

b. VARIATION DISPLAY

The N260 may be programmed to show percentage variation while in RUN. If Variation display is selected, the numbers in each channel are the difference between the present load value and the BENCHMARK expressed as a percentage of the BENCHMARK. For example, if the BENCHMARK value is 50 tons and this cycle the corner hits 55 tons, the display will show 10.0 percent. Likewise if the next cycle hits 40 tons in that corner, the display will show -20.0 percent. When VARIATION display is selected, it is easy to see when load values start to drift away from the BENCHMARK.

4. THE BENCHMARK, HIGH, LOW PUSHBUTTON SWITCH

The BENCHMARK, HIGH, LOW pushbutton is located in the upper right corner on the front door of the N260 enclosure. Each time the button is pressed, the display changes to show the next of the three numbers. The sequence is BENCHMARK, HIGH, LOW, BENCHMARK, HIGH, LOW, etc.

a. BENCHMARK DISPLAY

When this pushbutton is pressed and both HIGH and LOW LEDS are on, the display is showing the BENCHMARK load in each channel. These numbers are always load values and never percentages.

b. HIGH SETPOINT DISPLAY

When the pushbutton is pressed and only the HIGH LEDs are on, the display is showing the HIGH setpoints. When VARIATION display is selected, the numbers shown are the difference between the HIGH setpoints and the BENCHMARK, expressed as a percentage of the BENCHMARK, to the nearest tenth percent. The numbers displayed after each press cycle must be higher than these HIGH setpoints before the N260 alarms and opens the relay.

c. LOW SETPOINT DISPLAY

When the pushbutton is pressed and only the LOW LEDs are on, the display is showing the LOW setpoints. When VARIATION display is selected, the numbers shown are the difference between the LOW setpoints and the BENCHMARK, expressed as a percentage of the BENCHMARK, to the nearest tenth percent. The numbers displayed after each press cycle must be lower than these LOW setpoints before the N260 alarms and opens the relay.

B. USING THE DISPLAY AND KEYBOARD - Refer to figure 7

At any given time the N260 will be showing one of three displays: the load for the last stroke according to the operational mode, other information as requested by the user, or new data entered via the keyboard. These displays will be referred to as the load display, the data display, and the data entry display. These three displays only affect the user-N260 interaction. The operational modes discussed later affect the N260-press interaction.

1. LOAD DISPLAY

When power comes on initially the display is a LOAD DISPLAY. If this is the first time power was applied, PEAK operational mode is selected along with AUTO-SET. Otherwise the N260 is restored to the operational mode in use when the power went off. Whenever the "RESET" key is pressed the display returns to LOAD DISPLAY.

LOAD DISPLAY shows the load from the last press stroke in each channel (0-9). If the N260 is operating in Auto-set and Variation display is selected (dipswitch #11-3 down on the main PC), the display shows the difference between the present load and the BENCHMARK expressed as a percentage of the BENCHMARK. Out of tolerance loading is indicated by the low and high LEDs above each channel.

2. DATA DISPLAY

When the operator requests data rather than a mode change, the display becomes a DATA DISPLAY. For example, if the N260 is displaying the PEAK load and you wish to view the HIGH SETPOINTS, pressing the right key sequence puts the N260 display in DATA DISPLAY. This display is changed in one of three ways. If the "RESET" key is pressed, the display returns to LOAD DISPLAY. Likewise if no key is pressed, after about 13 seconds the display returns to LOAD DISPLAY. Or if a channel number is pressed while in DATA DISPLAY, the display changes to a DATA ENTRY DISPLAY.

3. DATA ENTRY DISPLAY

The display becomes a DATA ENTRY DISPLAY when a channel number key is pressed (0-9) or the decimal point key is pressed while the display is a DATA DISPLAY. DATA ENTRY DISPLAY may be distinguished from DATA DISPLAY by observing the operating mode indicator LEDs. When in DATA DISPLAY the operating mode LEDs are on to indicate the operating mode. In DATA ENTRY DISPLAY these 6 LEDs are all off. In addition, only the channel in which data is being entered is displayed while all others are blank.

Once a channel for entry is selected, the value may be changed or a new value entered using the number keys (0-9) and decimal point key (.). Pressing the "CLEAR" key will clear the data to 0. The up and down arrow keys may also be used to increase or decrease the number in the display. If either arrow key is held down for more than 1.5 seconds, the number will change rapidly until the arrow key is released.

When the DATA ENTRY DISPLAY shows the desired number, press the "ENTER" key to actually store the value. Pressing "ENTER" does a number of things. First the number shown is stored in main memory. Then the display changes to DATA DISPLAY with all channels on again. Now another channel may be selected and data entered, other data displayed, or load may be displayed once again by pressing "RESET".

DATA ENTRY DISPLAY may only be changed with the "ENTER" key or the "RESET" key. "ENTER" stores the value and returns the display to DATA DISPLAY. "RESET" changes the display to LOAD DISPLAY, showing the load in the operating mode selected.

4. KEY SEQUENCES

Data in the N260 is accessed from the keyboard using meaningful key sequences. A key sequence may consist of one, two or three keys pressed in a row. Whenever a key is pressed, which data is displayed depends not only on the key pressed but also on the last two keys pressed. Therefore it is a good idea to press the "RESET" key before starting the key sequence.

C. SETPOINTS

1. CAPACITY SETPOINTS - See Initial Settings under Installation

Each channel has a CAPACITY SETPOINT automatically set at capacity. Any time press capacity is exceeded in any channel, the high alarm LEDs light and the relay opens. The display freezes to show the overload. Thus it is not possible to exceed the maximum rating of the press in any operating mode.

2. PERCENT SETTINGS - % [(% again for low) (arrow or #(0-9) arrow) ENTER]

Each channel has a high and low percentage setting for use with Auto- set. This number is used to set the HIGH and LOW setpoints based on the allowable % variation from the benchmark value. There is a separate high and a separate low percentage. These percentages may be set from 2% to 45%. Any one of 15 values may be selected. The possible values are 2%, 4%, 6%, 8%, 10%, 12%, 14%, 16%, 18%, 20%, 25%, 30%, 35%, 40%, and 45%. It is also possible to select 0%. If 0% is selected, the HIGH setpoints are set to capacity and the LOW setpoints are set to 0.

To view the percentage settings for the HIGH setpoints press "RESET" and then the "%" key. Press "%" again to view the LOW percentage settings. The HIGH % numbers appear under the HIGH LED and the LOW % settings appear under the LOW LED. You may switch back and forth between HIGH and LOW settings by pressing the "%" key again and again.

There are two ways to change these percentages when they are displayed. All settings may be changed at once by pressing the up or down arrows until the desired setting is shown. To change the setting for a particular channel, press the channel number (0-9) and then use the up or down arrows to select the desired setting. Press "ENTER" to store the value in memory.

3. HIGH SETPOINTS - HIGH [#(0-9) (VALUE) [BYPASS] ENTER]

Each channel has a HIGH SETPOINT associated with that channel. When the load displayed for the operational mode selected exceeds the HIGH SETPOINT in a channel, the HIGH LED in that channel lights indicating an overload. If that HIGH SETPOINT is not bypassed and the N260 is not in SET-UP, the relay will open at the end of the stroke to shut down the press. (If the preset counter for the alarmed channel is set to 0 the relay will open immediately, not at the end of the stroke).

To display the HIGH SETPOINTS, press "RESET" then "HIGH". The HIGH SETPOINT for each channel will be displayed in its own channel window. The HIGH LEDs will be on in each channel to indicate that the HIGH SETPOINTS are being displayed. If the low LED is on in a channel, that channel is bypassed.

To enter new HIGH SETPOINT values press the number key (0-9) of the channel you wish to change. All displays will go blank except for the channel selected. A new value may now be keyed in using number keys. Once the desired value is shown press "ENTER" to store the data. The display will again show the HIGH SETPOINTS of all channels.

NOTE: If the N260 is in AUTO-SET, the HIGH setpoints will be set automatically using the % settings when the N260 "learns". The pushbutton on the front door displays the setpoints without opening the N260 door. Setpoints may still by bypassed from the keyboard as described below.

The HIGH SETPOINTs may be bypassed on an individual basis. If bypassed, when the load in a particular channel exceeds the HIGH SETPOINT of that channel the HIGH LED will light but the shutdown relay will not open. To bypass the setpoint, press the "BYPASS" key at any time while entering the HIGH SETPOINT value. Pressing the "BYPASS" key more than once will toggle that setpoint into and out of the BYPASS condition. The LOW LED in the channel indicates the status of the BYPASS. If the LOW LED is on then the channel is BYPASSED; if the LOW LED is off then the channel is NOT BYPASSED.

The display returns to displaying loads 13 seconds after the "ENTER" key is pressed or when the "RESET" key is pressed.

4. LOW SETPOINTS - LOW [#(0-9) (VALUE) [BYPASS] ENTER]

Each channel has a LOW SETPOINT associated with that channel. When the load displayed for the operational mode selected is less than the LOW SETPOINT in a channel the LOW LED in that channel lights indicating an underload. If that LOW SETPOINT is not bypassed and the N260 is not in SET-UP, the relay will open at the end of the stroke to shut down the press. To display the LOW SETPOINTS, press "RESET then "LOW". The LOW SETPOINT for each channel will be displayed in its own channel window. The LOW LEDs will be on in each channel to indicate that the LOW SETPOINTS are being displayed. If the Low LED in a channel is not on, that channel is bypassed.

To enter new LOW SETPOINT values press the number key (0-9) of the channel you wish to change. All displays will go blank except for the channel selected. A new value may now be keyed in using number keys. Once the desired value is shown press "ENTER" to store the data. The display will again show the LOW SETPOINTS of all channels.

NOTE: If the N260 is in AUTO-SET the LOW setpoints will be set automatically based on the % settings when the N260 "learns". The pushbutton on the front door displays the setpoints without opening the N260 door. Setpoints may still by bypassed from the keyboard as described below.

The LOW SETPOINTs may be bypassed on an individual basis. If bypassed, when the load in a channel fails to reach the LOW SETPOINT of that channel the LOW LED will light but the shutdown relay will not open. To bypass the setpoint, press the "BYPASS" key at any time while entering the LOW SETPOINT value. Pressing the "BYPASS" key more than once will toggle that setpoint into and out of the BYPASS condition. The LOW LED in the channel indicates the status of the BYPASS. If the LOW LED is off then the channel is BYPASSED; if the LOW LED is on then the channel is NOT BYPASSED.

The display returns to displaying loads 13 seconds after the "ENTER" key is pressed or when the "RESET" key is pressed.

5. RESETTING ALARMS - RESET RESET RESET

To reset the N260 from the alarmed condition (relay open) press the "RESET" key three times in a row. Or turn the RESET keyswitch on the front door to the RESET position. The shutdown relay will close allowing press operation and any LEDs indicating alarms will be turned off (high and low or precount).

D. COUNTERS

NOTE: The stroke counter and the batch counter only operate if the total load is within the range set by the counter setpoints. For more information on these setpoints see the counter setpoint section.

1. THE STROKE COUNTER - COUNT

Each load stroke of the press is counted. To display the COUNT press "RESET" then "COUNT". The COUNT appears as an 8-digit number in channel 0. The COUNT is cleared to 0 by pressing the "CLEAR" key while the count is being displayed.

2. THE BATCH COUNTER-PRECOUNT (VALUE) [BYPASS] ENTER, COUNT PRECOUNT

The pre-determined batch counter may be set from 0 to 99,999,999. This counter counts down starting from the preset value every time a load stroke is made. When zero is reached, the PRECOUNT LED lights and the relay opens to stop the press. The shutdown feature may be bypassed so that only the PRECOUNT LED lights but the relay does not open when zero is reached. When zero is reached the counter is reset again to the predetermined value for the next batch.

To set the counter, press the "PRECOUNT" key. The pre-determined value is shown in the channel 0 display. To enter a new value simply key in the number and press "ENTER". To bypass the pre-determined counter press "BYPASS" before pressing the "ENTER" key.

The present value of the pre-determined counter may be viewed at any time. This is done with the key sequence "COUNT" "PRECOUNT". The value will be shown in the channel 0 display, and decreases with each load stroke of the press. When zero is reached, this counter is set back to the initial pre-determined value.

When power comes on initially, the pre-determined count is set to 0. When set to 0, no counting or shut down occurs. So to de-activate the pre-determined counter after it has been in use simply enter a new value of 0.

3. THE ALARM COUNTERS

a. HIGH COUNTERS - COUNT HIGH

Each time the HIGH SETPOINT is exceeded by the load displayed in a particular channel (0-9) this event is counted. A running total of HIGH ALARM COUNTS is thus kept for each channel. This counter counts up to 9,999 before rolling over to 0 again. The count increases regardless of the bypass status of the channels.

To display the HIGH ALARM COUNT, the key sequence is "COUNT" "HIGH". Channels 0-9 will now show the number of HIGH ALARMS, which have occurred since the HIGH ALARM COUNT was last cleared. The HIGH LEDs are on to indicate HIGH count as opposed to low count. To clear the counts, press the "CLEAR" key while the counts are being displayed. The HIGH ALARM COUNT for each channel is then cleared to 0. "ENTER" need not be pressed.

b. LOW COUNTERS - COUNT LOW

Each time the LOW SETPOINT is not reached by the load displayed in a particular channel (0-9) this event is counted. A running total of LOW ALARM COUNTS is thus kept for each channel. This counter counts up to 9,999 before rolling over to 0 again. The count increases regardless of the bypass status of the channels.

To display the LOW ALARM COUNT, the key sequence is "COUNT" "LOW". Each channel will now show the number of LOW ALARMS, which have occurred since the LOW ALARM COUNT was last cleared. The LOW LEDs are on to indicate LOW count as opposed to high count. To clear the counts, press the "CLEAR" key while the counts are being displayed. The LOW ALARM COUNT for each channel is then cleared to 0. "ENTER" need not be pressed.

E. ADDITIONAL OPERATING MODES

1. AUTOSET - LOW COUNT [. (up or dn arrow to 2) ENTER]

When the N260 is initially powered up it is in AUTOSET. Once the instrument is calibrated it is not necessary to open the door to operate the N260 as long as it is in AUTOSET. When the key switch on the front door is in the SETUP position the HIGH and LOW setpoints will not shut down the press. If, however, the load in any channel exceeds press capacity the N260 will alarm and open the relay.

Once the key switch has been moved to the RUN position and eight machine cycles have occurred the N260 removes itself from SETUP and displays the load for each machine cycle.

When the N260 is in AUTOSET, an "L" appears in the leftmost position of the channel 0 display. However, the appearance of an "L" does not always mean the N260 is in AUTOSET. The "L" also signifies the average mode. To verify AUTOSET mode press the keys LOW COUNT (dec. pt.). The number (0-3) shown in the left channel 0 display indicates the type of mode. If this number is 0, the N260 is in MANUAL. If this number is 1, the N260 is in averaging mode. If this number is 2 the N260 is in AUTOSET. To put the N260 into AUTOSET, use the up and down arrows to set this number to 2 and then press "ENTER". To remove the N260 from AUTOSET and put it into MANUAL, use the arrow keys to set the number to 0 and then press "ENTER".

a. NORMAL DISPLAY - dipswitch SW11-3 up - see figures 5 and 6

Normally the N260 displays the load in tons, pounds, or whatever units have been selected for capacity.

b. VARIATION DISPLAY - dipswitch SW11-3 down - see figures 5 and 6

If VARIATION display is selected, after the N260 has established the BENCHMARK with a "learn" operation the display shows the load values as a percentage VARIATION from the BENCHMARK. Each number displayed is the difference in the present load and the BENCHMARK expressed as a percentage of the BENCHMARK. For example, if the BENCHMARK value for a channel is 50 and the load on this stroke is 60 the VARIATION display will show 20.0 %. If the load on the next stroke is 45 the display will show -10.0 %.

2. MANUAL - LOW COUNT [. (up or dn arrow to 0) ENTER]

The N260 may be run in MANUAL (Auto-Set de-activated) if desired. In MANUAL the HIGH and LOW setpoints must be entered manually from the keyboard. The keyswitch on the enclosure door should be left in the RUN position for the setpoints to be active. If turned to the SETUP position the HIGH and LOW setpoints are unused and only the capacity setpoints are active.

To put the N260 into MANUAL, press "LOW" "COUNT" (dec. pt.). Use the arrow keys to adjust the number to 0 and press "ENTER". The "L" which was in channel 0 will disappear.

3. DIE MEMORY - SETUP [(00-99) ENTER]

The DIE MEMORY feature works in both AUTOSET and MANUAL. This feature allows the user to store the setpoints, operating mode, and any user entered parameters in a non-volatile memory with a 00-99 program number. Thus up to 100 programs may be stored in the memory. Typically the user would assign a number to each die and select that program number the first time the die is run. The N260 automatically stores the settings for later recall. When that die is run the next time the user enters the program number for the die and all the N260 settings are automatically called up.

To display the current program number press "SETUP" on the keyboard. A two-digit number will appear in channel 0 and the rest of the display will be blank. This is the program number. When the N260 is initially powered up this number is set to 0. To change to another program, enter the new number (0-99) and press "ENTER". If data has been stored before under this program number, it is recalled into operating memory. If this program number is unused, the data stored in program 0 is used and loaded instead. This means that program 0 should be reserved as a setup with general parameters to get any new job going.

4. SETUP - SETUP SETUP

SETUP is used for setting up a job because the HIGH and LOW setpoints are not activated. Whenever the SETUP LED is on the N260 is in SETUP. SETUP may be entered by pressing the SETUP key inside the N260 enclosure TWICE. Pressing the SETUP key two times again will remove the N260 from SETUP, activating the setpoints. As noted above, the first time the SETUP key is pressed the program number is displayed. The key must be pressed two times in a row to toggle the LED and the N260 into and out of SETUP.

If the N260 is in AUTOSET, it is not possible to leave the N260 in SETUP without turning the keyswitch on the door to the SETUP position. If the N260 is in RUN, and then put into SETUP from the keyboard, the N260 will learn on the next 8 strokes and turn the SETUP LED off. Only capacity setpoints are active when the N260 is in SETUP.

5. TIME MODE - TIME TIME

a. DESCRIPTION OF TIME MODE

The TIME mode selects one of four special operating modes, which are used with the TIME value. The N260 is in TIME mode when the TIME LED is on. The TIME LED may be toggled on and off by pressing the TIME key twice. When the TIME LED is on, the TIME mode digit appears in the left portion of the channel 0 display.

To select a different TIME mode (0-3) press the "TIME" key followed by the DEC. PT. key. The display will show a single 0-3 digit indicating the present TIME mode. Press the up or down arrow keys to set the desired TIME mode then press "ENTER". The following table shows the mode corresponding to each number.

TIME mode number	Special operating mode
0	B4 mode
1	First level mode
2	Second level mode
3	Point-in-time mode

b. SETTING THE TIME VALUE - TIME [0 (VALUE) ENTER]

A TIME VALUE may be entered which, when used with TIME mode described below, can show the peak load for various portions of the stroke. The timer starts at the time the N260 is triggered (with the THRESHOLD or PROBE INPUT) and continues until the number of seconds equal to the TIME VALUE has elapsed.

To display the TIME VALUE press the "TIME" key once. Channel 0 will show a number 0 to 9.999. This is the TIME VALUE in seconds. To change the value, press "0" and key in the new value. Press "ENTER" to finish the entry process. The maximum delay, which can be entered, is 9.999 seconds.

c. THE POINT-IN-TIME MODE - TIME [. (up or dn arrow to 3) ENTER]

The N260 can be set-up to display the load at a particular point in the stroke. This can be accomplished in a variety of ways. The most common way uses the time value as a delay from the point at which the load signal crosses the threshold at the start of loading. Thus when the amount of time since the threshold crossing elapses, the N260 reads the load value and stores this number in the memory.

Another way to trigger this point-in-time reading is very similar to the above method. If a probe is used in place of the threshold, the timer starts when the threshold probe triggers. When the time is up (time delay from probe activation), the load at this point is the point-in-time load

The last way to gather this point-in-time data is by using a probe dedicated exclusively to this point-in-time function. When the TIME VALUE is set to zero and the N260 is in TIME mode, this probe is activated. When the TIME probe turns on, the meter stores the load seen at this point in the memory.

To display the Point-In-Time load the N260 must be in TIME mode number 3. Press the keys "RESET" "TIME". The display will show the TIME VALUE in channel 0 (X.XXX) and a single digit number to the left of this value. The single digit number is a number from 0 to 3. This is the time mode number. Press the DEC. PT. key to select this single digit number. Press the up or down arrow keys until the number displayed is a 3. Now press "ENTER". The N260 is now selected for time mode number 3 but may not be activated. To activate the TIME mode, the TIME LED must be on. If the TIME LED is not on, press the TIME key twice to light the TIME LED, activating the TIME mode.

Now with the Point-In-Time mode selected, every stroke of the press will display the loading at this point in time. With the TIME mode selected, high and low setpoints will apply to this load and alarms will be determined now on the basis of the load at the point in time.

d. THE FIRST LEVEL LOAD - TIME [. (up or dn arrow to 1) ENTER]

The FIRST LEVEL load is the peak loading which occurs during the portion of the stroke from the initial threshold crossing until the time point is reached.

To use the FIRST LEVEL load mode, the TIME VALUE must first be set. See the section concerning TIME VALUE for more information on how to do this.
The right TIME mode must also be selected to see the FIRST LEVEL loading. FIRST LEVEL is TIME mode #1. To set the TIME mode, press "TIME" then DEC.PT. Use the up and down arrows to select TIME mode #1. Press "ENTER" to store this number.

Now unless the N260 is in TIME mode, the FIRST LEVEL loads will not be shown. The N260 is in the TIME mode when the TIME LED is on. If this LED is on, nothing more needs to be done-the N260 should now display the FIRST LEVEL loads. If the N260 is not in TIME mode (Time LED not on) press "TIME" twice and the TIME LED should light.

When the N260 is in the FIRST LEVEL mode, the high and low setpoints apply to the FIRST LEVEL load.

e. THE SECOND LEVEL LOAD - TIME [. (up or dn arrow to 2) ENTER]

The Second Level loading is the peak load, which occurs in each channel between the TIME point and the end of the stroke. To display the Second Level loading the N260 must be put into the TIME mode 2. When in this mode, setpoints will apply to the loads displayed.

To select the Second Level mode, press the key sequence "RESET" "TIME". Now press the DEC. PT. key. Press the up and down arrows until the number displayed is a 2. Press "ENTER" to store the value. If the TIME LED is on press "RESET". If the TIME LED is off, press "TIME" twice. The TIME LED must be on to select the Second Level mode.

f. THE B4 MODE - TIME [. (up or dn arrow to 0) ENTER]

The B4 mode is a combination of the normal peak mode and first level mode. When selected the B4 mode displays the distribution forces at the first level time in channels 1 thru 4. Then when the punch finishes the stroke the total load is displayed in channel 0. The B4 mode only applies to the N264.

In this way setpoints may be set on the first level load using channels 1 thru 4 as well as on the total load using channel 0 for the same stroke of the press.

To select the B4 mode the N260 must be in TIME mode 0. Press the keys "RESET" "TIME". The display will now show the TIME VALUE in channel 0 and the TIME mode digit to the left of the TIME VALUE. Press the DEC. PT. key and then the up or down arrow keys until the digit displayed is a 0. Press "ENTER" to store the number. If the TIME LED is on just press "RESET" to display loads again. If the TIME LED is off, press the "TIME" key twice and then "RESET". Once the TIME LED is on, the N260 is in TIME mode and with TIME mode 0 selected the display shows B4 loads.

Setpoints will now apply to the loads that are displayed. This means that channels 1 thru 4 cover the distribution load and channel 0 covers the total load. For more information about the TIME VALUE refer to its own discussion elsewhere in the manual.

6. AVERAGE LOADS - LOW COUNT [. (up or dn arrow to 1) ENTER]

The N260 can be set to display the average of the previous 16 press strokes rather than displaying each stroke if desired. Averages for any operating mode can be shown, but only the average of the present operating mode is calculated for each press stroke. This means that it will require 16 strokes in a particular mode before the N260 will be showing accurate averages. When the display is showing average loads the high and low setpoints trigger off of these averages for alarms.

AVERAGE may only be selected if the N260 is in MANUAL. If the N260 is used in AUTOSET, AVERAGE may not be selected.

To select averaging mode, press the key sequence "LOW" "COUNT" DEC PT. (.). The display will show a single digit in the left portion of the channel 0 display. This digit will be a 0 when the N260 is NOT in the averaging mode. To put the N260 in average mode press the up or down arrow keys until this digit is a 1. Then press the "ENTER" key. After 13 seconds elapses or after "RESET" is pressed the N260 will show the average load of the last 16 strokes. In the far left portion of the channel 0 display the letter "L" will appear to indicate that the N260 is displaying average load.

To go back to displaying normal loads use the above procedure to set the single digit average number back to 0 for MANUAL or to 2 for AUTOSET.

7. REVERSE - REV

REVERSE changes the polarity of the input analog signal. The main use of this key is to read "snap-through" loading which occurs primarily in blanking operations. To select REVERSE, press the "REV" key. The REVERSE LED will light indicating this display. Pressing the "REV" key again will turn off the REV LED and the REVERSE function.

If the N260 is in PEAK and in REVERSE, the setpoints are not activated. Thus the N260 cannot be used to shut down the press when in REVERSE. REVERSE is provided mainly as a diagnostic tool.

The reverse key may be pressed at any time to view the snap through of the last stroke.

F. OTHER SETTINGS

1. THE COUNTER SETPOINTS - (HIGH or LOW) COUNT [0 (value) ENTER]

The stroke counter and batch counter have a high and a low setpoint which may be set to cause the counter to count only those strokes with load greater than the low setpoint and less than the high setpoint. This can be used to ignore machine cycles made empty. These setpoints operate on the basis of the load in channel 0. If the instrument has more than 5 channels, channel 5 is used instead of channel 0 because the load on the inner slide is usually more meaningful. So to count the stroke the channel 0 load (or chan 5) must exceed the low count setpoint but not the high count setpoint.

To set the low setpoint use the key sequence "LOW" "COUNT" "0". Only the counter low setpoint will be displayed in channel 0. A new value may be entered using the number keys. When finished, press "ENTER" to store the new value. The initial value of the low count setpoint is 0.

To set the high setpoint use the key sequence "HIGH" "COUNT" "0". Only the counter high setpoint will be displayed in channel 0. A new value may be entered using the number keys. When finished, press "ENTER" to store the new value. Initially the high count setpoint is set to two times capacity.

2. CLEARING THE MEMORY - CLEAR held down RESET RESET RESET

The memory of the N260 can be cleared with a special key sequence at the keyboard. When this is done, all counts and stored load values are cleared to 0. The setpoints and any operating parameters are reloaded from the 0-99 program memory according to the program number selected. The LOWEST LOAD values are set to capacity for the next stroke.

To clear the memory, press and hold the "CLEAR" key. While holding the CLEAR key down press the "RESET" key three times in a row. The N260 memory will be cleared as described above. This establishes a known base from which changes can be made to set-up parameters.

3. PRESET COUNTERS - PRECOUNT COUNT [chan #(0-9) (any arrow) ENTER]

A preset counter is a single digit number from 0 to 9 associated with a high or low setpoint. This number determines the number of consecutive high or low alarms required before the relay opens to stop the press. Each channel has a separate 0-9 preset counter for both the high and the low setpoints.

For example, if the high preset counter in channel 3 is set to 5, the load in channel 3 would have to exceed the channel 3 high setpoint 5 strokes in a row before the shutdown relay would open. If the low preset counter in channel 2 is set to 3, the load in channel 2 must be lower than the channel 2 low setpoint for 3 strokes in a row before the shutdown relay would open.

Normally the shutdown relay does not open until the press has completed the stroke and the load has fallen below threshold. The N260 can be made to shutdown the press immediately in the event of a high alarm by setting the high preset counter in any channel to 0. So if the high preset counter is set to 0 the press stops immediately. If the high preset counter is set to 1, it is not shutdown until the end of the stroke. A low preset counter setting of 0 is the same as a setting of 1.

The preset counters may be displayed by pressing "PRECOUNT" and then "COUNT". Each channel shows two single digit numbers from 0 to 9. The digit under the low LED is the low preset counter and the digit under the high LED is the high preset counter in each channel.

To change a number, select a channel by pressing the channel number (0- 9) you wish to change. The digit under the lighted LED may now be changed using the up or down arrow keys. To change the lighted LED use the right arrow key. Pressing "ENTER" stores these values in the memory. You may now change the preset counters of another channel by selecting that channel. Any changed values will take effect on the next stroke.

"RESET" may be pressed at any time to display the load once again.

G. OTHER INFORMATION

1. THE LAST ALARM - HIGH LOW or LOW HIGH

Whenever an alarm occurs in the N260, the information shown in the display is saved in memory. This information is stored as the Last Alarm and is changed whenever another alarm occurs. This information about the Last Alarm can be recalled to the display by pressing the right key sequence at the keyboard.

To display the Last Alarm load information press the key sequence "HIGH" "LOW" or "LOW" "HIGH". The display will show the load in each channel for the press stroke that caused the alarm. Pressing "CLEAR" at this time will clear the data to zero in each channel. Pressing "RESET" will call up the load from the last press stroke.

2. THE LAST HIGH ALARM - HIGH TIME

Whenever a high alarm occurs in the N260, the information shown in the display is saved in the memory. This information is stored as the Last High Alarm and is updated whenever another high alarm occurs. This information about the Last High Alarm can be recalled to the display by pressing the right key sequence at the keyboard.

To display the Last High Alarm load information press "HIGH" "TIME". The display will show the loading in each channel for the press stroke that caused the high alarm. Pressing "CLEAR" at this time will clear the data to zero in each channel. Pressing "RESET" will call up the load from the last press stroke.

3. THE LAST LOW ALARM - LOW TIME

Whenever a low alarm occurs in the N260, the information shown in the display is saved in the memory. This information is stored as the Last Low Alarm and is updated whenever another low alarm occurs. This information about the Last Low Alarm can be recalled to the display by pressing the right key sequence at the keyboard.

To display the Last Low Alarm load information press "LOW" "TIME". The display will show the loading in each channel for the press stroke that caused the low alarm. Pressing "CLEAR" at this time will clear the data to zero in each channel. Pressing "RESET" will display the load from the last press stroke.

4. THE HIGHEST LOAD - HIGH HIGH

The highest load seen in a particular channel (0-9) is stored in the N260 memory. To display this information press "RESET" "HIGH" "HIGH". The display will show the highest load that each channel has seen. The numbers shown for the various channels could have occurred on different strokes of the press and therefore must be considered to be unrelated to one another.

To clear these values press "CLEAR" at any time while they are being displayed. The display will then show 0 in each channel.

5. THE LOWEST LOAD - LOW LOW

The lowest load seen in a particular channel (0-9) is stored in the N260 memory. To display this information press "RESET" "LOW" "LOW". The display will show the lowest load that each channel has seen. The numbers shown for the various channels could have occurred on different strokes of the press and therefore must be considered to be unrelated to one another.

To clear these values press "CLEAR" at any time while they are being displayed. The display will then show capacity in each channel until the next press stroke occurs. The values are set to capacity rather than to 0 to be sure that we can properly detect low values including a load as low as 0.

6. THE PRODUCTION RATE IN STROKES PER MINUTE - COUNT TIME

The speed of the press may be displayed as a 4-digit number in strokes per minute. To display the strokes per minute press "RESET" "COUNT" "TIME". The channel 0 display will now show the press speed based on the last two strokes in strokes per minute.

7. THE DOWN-TIME (Time since the Last Stroke) - TIME COUNT

The N260 keeps track of the time that has elapsed since the last press cycle occurred. This time since the last stroke is an indication of the down time. Every time a new stroke occurs this time is reset to 0. To display the down time, press "TIME" "COUNT". The channel 0 display will show three numbers separated by spaces. These numbers are from left to right, days, hours, and minutes since the last stroke. When the time reaches 100 days the display rolls over to zero.

8. THE DIAGNOSTICS - DIAG DIAG .... DIAG

The DIAG key is used to display some elementary diagnostic information. Pressing the DIAG key will show one of ten pieces of diagnostic information in channel 0. A single digit (0-9) appears in the left display to indicate which info is being displayed. The information appears in channel 0 as a 4-digit value. Every time the DIAG key is pressed the DIAG digit is incremented to show the next diagnostic information.

The following table explains what each digit means.

DIGIT	DATA	DESCRIPTION
0	XXXX	Main PC ROM checksum
1	X.XXX	Battery voltage in volts - replace if less than 2.5 volts or greater than 4.0 volts
2	1111	Status of probe inputs 7,6,5,4 1=off, 0=on
3	1110	Status of probe inputs 3,2,1,0 Input #0 = power status Input #1 = threshold probe Input #2 = time point probe
4	0111	Status of relay outputs 1,2,3,4 Output #1 = shutdown relay
5	1111	Status of relay output 5 Status of Autoset switches BENCHMARK, SETUP, RESET 1=off, 0=on
6	XXXX	Thumbwheel inputs--leftmost digit=SW11,1-4 Next digit=SW11,5-8 (4-8 = Address Select) SW11-1 = track mode raw data SW11-2 = checksum enabled for computer SW11-3 = variation mode if on Next digits = Thumbwheels 1&2
7	XXXX	Thumbwheel inputs 3,4,5,6
8	XXXX	Thumbwheel inputs 7,8,9,10
9	XXXX	Thumbwheel inputs 11,12,13,14

III. INSTALLATION

A. MOUNTING THE ENCLOSURE - see figures 1 and 2

The N260 comes in a 14x12x6 beige enclosure and should be mounted on or near the press so as to be easily seen by an operator. USE THE 4 SHOCK MOUNTS PROVIDED when mounting the enclosure to protect the electronic assemblies from excessive vibration.
All wiring connections to the N260 are made through the bottom of the enclosure and should use flexible conduit. At least three separate conduits must enter the enclosure. The power should be in its own conduit as well as the relay connections. It is absolutely essential that the sensor cables are run in conduit separate from the relay or power wires.

B. AC & POWER CONNECTIONS - POWER, RELAY, PROBE - see figure 3

The N260 requires continuous and filtered 115VAC power at 60 Hz. for proper operation. We recommend the use of a Sola transformer model 63-23-112-4 between the power source and the N260. Power consumption is less than 40 watts. In the event of AC power failure, a small battery located on the N260 main PC board will retain the present information stored in memory for a period of years. If this battery should fail the settings are still retained in a non-volatile EEPROM memory.

To expose the AC power connections, open the N260 enclosure door and remove the rectangular plate from the bottom of the cabinet. Behind the plate is the power supply circuit board containing the connections for AC power, the shutdown relay, and the probe inputs. The wires must enter the enclosure through a hole situated behind this plate. The AC power line is connected to the rightmost 3 terminals labeled L1, L2, and GND. Connect a good earth ground to the terminal labeled "GND". Connect the hot side of the AC line to the terminal labeled "L1" and the neutral side to "L2". A 6/10 amp fuse protects the system and is electrically connected on the "L1" or "hot" side.

The press shutdown relay contact connection is to the left of the AC power connection on the terminal strip through terminals labeled R1 and R2. This contact is normally closed, but opens in the event of an alarm OR the loss of AC power. The contact rating is 5 amps at 115VAC. The BYPASS switch on the chassis is connected across the relay contact. When in "BYPASS" (switch up) the switch shorts the relay contacts preventing shutdown even if an alarm or AC power failure occurs.

The connections to the probes are optional. Most applications will not use probes. If you are using them, each probe input has two terminals labeled P1 and P2. When the probe is "on" there should be 24-120 volts AC or DC across P1 and P2. When the probe is "off" the voltage should be 0. Normally some type of contact which switches the AC on and off is wired to these probe input terminals. Extra L1 and L2 terminals are provided if a source of 115 VAC is used for connection to the probes. See Figure 2 for more information.

C. SENSOR HOOKUP - see figures 5 and 6

Sensors should be wired with the power OFF. If the N260 has already been powered up power can be shut off by removing the fuse. Sensor connections are made to the N260 main PC board through removeable terminal blocks. Terminals on both the stationary and removeable portion of the block are color coded to match the sensor cable color code for normal tension measurements. R=RED, W=WHITE, G=GREEN, B=BLACK, S=SHIELD.

The color code is correct for SENSORS IN TENSION or for LOAD CELLS IN COMPRESSION. Reverse the GREEN and BLACK wires for sensors in compression or if the load cell spec. sheet says to do so. The fifth terminal labeled "S" is not used. Attach the wires to the terminal block and plug into the PC board receptacle.

D. POWERING UP THE N260

When power is initially applied to the N260, a minimal amount of information is needed before accurate loads may be displayed. Once this set up information is entered, if power is lost the internal battery and the EEPROM maintain this information in memory. If this power up configuration is not done immediately, the N260 may still be used because values are automatically assigned to these variables to allow limited operation.

AT POWER-UP :

CAPACITY	=	100.0 in each channel
HIGH SETPOINT	=	100.0 in each channel
THRESHOLD	=	6.3 in channel 0
OPERATING MODE	=	AUTOSET, PEAK
PRESET COUNTERS	=	1 high and low each channel
LOWEST LO TONS	=	100.0 in each channel
CNT HI SETPOINT	=	200.0 in channel 0
% SETTINGS	=	20% in each channel

All other data is set to 0.

Before using the N260 to accurately monitor tonnages the following must be done:

1. Enter press CAPACITY including the DECIMAL POINT location
2. BALANCE each channel
3. Set calibration numbers in each channel

These 3 steps will have been done during calibration. You may wish to verify that the right numbers have been entered if this is the case. Once the CAPACITY is initially entered it should never need to be re-entered.

E. INITIAL SETTINGS

1. DECIMAL POINT - HIGH HIGH HIGH [. (arrow) (dipswitch 8) ENTER]

To display the number of DECIMAL PLACES press "HIGH" "HIGH" "HIGH". A single digit appears in the left portion of the channel 0 display. This digit indicates the number of decimal places to the right of the decimal point in the displays. The number can be 0 (in which case no point is displayed), 1, 2 or 3 places.

To change this number, press the decimal point key. Only this digit will now be on. Press the up or down arrow keys until the single digit corresponds to the number of decimal places desired. Locate dipswitch #31-8 at the righthand side of the keyboard just beneath the front panel (see figure 6). Using a small screwdriver or pen press dipswitch 8 on the key PC board down and then up again. Now press "ENTER". The display will now show the CAPACITY again.

2. PRESS CAPACITY -HIGH HIGH HIGH [(0-9) (DATA) (dipswitch 8) ENTER]

Press capacity is displayed by pressing "HIGH" "HIGH" "HIGH". The capacity of each channel is displayed in that channel. New values may be entered by selecting a channel (0-9), entering the data value, pressing keyboard DIPSWITCH #31-8 down and then up (see Fig. 6), and pressing "ENTER". When capacity is keyed into channel 0, the total is evenly divided and automatically stored in channels 1-4. When capacity is keyed into channel 5, the total is evenly divided and automatically stored in channels 6-9.

Upon power up if the CAPACITY has not yet been set, each channel is set to the value 100.0 to indicate percentage. THE DISTRIBUTION CHANNELS WILL NOT ADD UP PROPERLY UNTIL CAPACITIES ARE ENTERED IN CHANNELS 0 and 5.

3. TRIGGERING THE N260

a. THE THRESHOLD - LOW LOW LOW [0 (VALUES) ENTER]

The N260 must be triggered to know when the load signal is applied and then relieved. This triggering can be either internal or external to the N260. The internal method is by the use of the THRESHOLD.

The THRESHOLD is the minimum total load that must be generated in channel 0 OR channel 5 before the signal is recognized as a load signal. To view the THRESHOLD press "LOW" three times in a row. The THRESHOLD is displayed in channel 0. This value can be changed by pressing the "0" number key followed by the new value followed by "ENTER". The value of the THRESHOLD when power comes on is 6.3% of capacity (channel 0). We recommend THRESHOLD values of at least 3% of capacity.

The N268 is programmed to display 0 for any loads that are less than the THRESHOLD of an unused slide. For example, if only the outer slide (chs. 0-4) of an underdrive press is being used, the display will show zeroes in channels 5-9 as long as the load is less than THRESHOLD.

b. THE PROBE INPUT - LOW LOW LOW [0 CLEAR ENTER]

The N260 can be triggered externally by the use of a 24-120 volt AC or DC signal applied to the probe input terminals. To trigger this way the voltage must be switched on at these terminals just before the load comes on and then removed just after the load comes off. This OFF-ON-OFF signal triggers the N260 for acquisition of the peak load. See installation instructions for wiring information about the probe input.

The N260 is set up to use the THRESHOLD method unless told otherwise. To select external triggering with the probe, enter a THRESHOLD value of 0. This tells the N260 to use the probe input rather than the THRESHOLD for triggering.

4. THE MAXIMUM CHANNEL NUMBER - LOW LOW LOW [. (up or dn) ENTER]

To display the MAXIMUM CHANNEL NUMBER press "LOW" "LOW" "LOW". The MAXIMUM CHANNEL NUMBER appears as a single digit in the left portion of the channel 0 display. This digit is an indication of the highest numbered channel being processed and displayed by the N260. Normally this number will correspond to the highest channel number of the N260. This number will be two if there are two sensor inputs and 0 when there is only one sensor input. With an N264 this number is 4. With an N268 this number is 9.

To change the MAXIMUM CHANNEL NUMBER displayed, press "." (decimal point) while the THRESHOLD is being displayed. The THRESHOLD will disappear from the display and only the MAXIMUM CHANNEL NUMBER will be shown. Press the up or down arrows to change this number, and then press "ENTER" to store the new value into memory.

This number determines the maximum press speed that the N260 can monitor. The following table shows the limitations.

MAXIMUM CHANNEL NUMBER	- Maximum Press Speed
0	- 3000 strokes per minute
1-2	- 1500 strokes per minute
3-4	- 800 strokes per minute
5-9	- 400 strokes per minute

It is possible to use an N264 or N262 at very high speeds by adjusting this maximum channel number down. The N260 must first be set up and calibrated with the right number of channels selected. Then this number may be reduced for higher speed operation. The setpoint protection, however, only applies to the channels selected.

5. TRACK (calibration) - TRACK

In TRACK the raw signal from each sensor scaled to the CAPACITY is shown in its corresponding channel. Channel 0 shows the total of channels 1 thru 4 and channel 5 shows the total of channels 6 thru 9. Each channel (1-4,6-9) can be BALANCED to zero by adjusting its BALANCE pot. To select TRACK press "TRACK". The TRACK LED will light and the PEAK LED will go out. Track is used primarily for calibration.

6. THE CALIBRATION SHUNT - SHUNT

The SHUNT is used to generate a reference number in each channel which is used as the calibration number for that channel. It is most often used in "TRACK" to properly set the gain in each channel. The shunt can, however, be used in PEAK as well by cycling on and off to generate a simulated load signal.

This key switch alternately engages and disengages the calibration shunt resistor in each channel. Pressing the "SHUNT" key once will engage the shunt. An "S" is displayed in the third digit from the left of channel 0 to indicate the shunt being engaged. Pressing the "SHUNT" key again will disengage the shunt and the "S" will disappear from channel 0. Although each channel uses a separate shunt resistor all shunts are simultaneously engaged or disengaged with the "SHUNT" key switch.

Each channel has one shunt resistor that has a value of 1 MEG. If the N260 is replacing a different type of instrument or if a load cell or sensor has been calibrated using a different valued shunt resistor a new calibration number will have to be calculated. This must be done because the N260 shunts are not removeable. They are permanently soldered into the main PC board.

7. PEAK - PEAK

In PEAK, the peak load generated during the last load cycle is displayed in each channel. Channels 1-4 and 6-9 show the load distribution. Channels 0 and 5 show the total of channels 1-4 and 6-9 respectively. The total channels (0 & 5) display the peak of the sum of the distribution channels based on time. For example, if the peaks of the distribution channels (1-4) do not occur at the same instant in time, channels 1-4 will not add up to channel 0. However, the value shown in channel 0 is a better representation of the actual peak load seen by the press during the stroke than the sum of the peaks shown in the distribution channels 1-4.

PEAK is entered by pressing "PEAK". When pressed, the PEAK LED will light and the TRACK LED will go out. The PEAK values of the last load cycle will be displayed in each channel. Peak is the normal operating mode of the N260.

F. CALIBRATION

The N260 must be calibrated to display accurate load values generated by the machine. BEFORE EACH CHANNEL CAN BE CALIBRATED IT MUST HAVE THE RIGHT CAPACITY ENTERED. If this has not been done yet, refer to the section concerning capacity in the previous portion of the manual.

Each channel has three adjustments which must be made to calibrate the N260. These are the BALANCE pot, the GAIN pot, and the LOW-HIGH GAIN switch. There are a number of ways to calibrate the N260 as discussed below. All involve using one precision shunt resistor (1 meg +- .1%) per channel switched across one leg of each input channel's strain-gage bridge to generate a reference (calibration) number.

1. PRE-CALIBRATED LOAD CELLS

When a pre-calibrated load cell is the input for a particular channel, the calibration number has already been determined at the factory. This number is normally included in a spec. sheet shipped with the load cell. The cal number, however, is dependent upon the value of the shunt resistor. If the cal number on the spec sheet is for a shunt different than the 1 MEG shunt used in the N260 a conversion must be made. When the right number is determined, the BALANCE and GAIN must be adjusted to read this number on the channel associated with the load cell.

Put the N260 in "TRACK" by pressing "TRACK" on the keyboard. Be sure all load cells are properly wired into the channel terminal blocks. Set the LOW-HIGH GAIN switch to LOW or HIGH as required by the load cell spec. sheet in the channel being calibrated. Using a small screw driver adjust the BALANCE pots (labeled "B") so that each channel reads 0 in the display. Turning clockwise causes numbers to increase.

Now press "SHUNT" on the keyboard. You should see an "S" appear in the left portion of the channel 0 display. This indicates that the shunt is engaged. Adjust the GAIN pot (labeled "G") until the calibration number is seen in the channel display corresponding to that load cell. Depress the shunt key again and the "S" should disappear from channel 0. Each channel should now display 0. If not, BALANCE the channel to zero again using the BALANCE pot and then engage the shunt again. Adjust the GAIN pot if needed to display the right calibration number again. Dis-engage the shunt and read 0 in the display.

It is possible that the LOW-HIGH GAIN switch will need to be in a different position for normal operation than it is when setting the calibration number. Check the spec. sheet and if necessary change the setting of the LOW-HIGH GAIN switch. A normal operation mode may now be selected.

2. CALCULATED CALIBRATIONS

If the precise area of the member to which the strain gage is attached is known, sometimes a calculated calibration can be given. In this case a specification sheet is provided showing the right calibration numbers for each channel. Also shown on this sheet is the right setting of the LOW-HIGH GAIN switch for both calibration and normal operation. Follow the same procedure followed for pre-calibrated load cells to set in the correct calibration numbers.

3. ON SITE CALIBRATION USING REFERENCE LOAD CELLS

The N260 may also be calibrated by using pre-calibrated load cells placed in the bed of the press and the N114 portable load monitor. The procedure is to develop a known load on the load cells of about press capacity evenly distributed among the cells and adjust the GAIN of the N260 so that the channel readings match those of the load cells.

Put the N260 in "TRACK" and BALANCE each channel to 0. Place the N260 in "PEAK" and in "SETUP". Strike the load cells and adjust the shut- height and/or shim the cells until the N114 shows an evenly distributed capacity load on the press. Now adjust the GAIN pot and if necessary the LOW-HIGH GAIN switch of each channel so that on each press cycle the N260 reads the same as the N114. When each channel of the N260 reads the same as the corresponding channel of the N114 and the totals match, the N260 is calibrated.

Now the calibration number for each channel must be recorded. Put the N260 in "TRACK". Seal the GAIN pot of each channel with nail polish so that it will not be adjusted any more. Adjust the BALANCE pot of each channel so that each channel reads 0. Push the "SHUNT" key to engage the shunt ("S" appears in channel 0). Record the reading displayed in each channel - this is the calibration number for that particular sensor. Also record the position of the LOW-HIGH GAIN switch for each channel. Push "SHUNT" once more to disengage the calibration shunt for operation.

If the calibration number is less than 25% of the capacity of a particular channel, a better calibration number with more resolution can be obtained by switching from LOW to HIGH GAIN on the LOW-HIGH GAIN switch FOR CALIBRATION PURPOSES ONLY. If this is desired, re-BALANCE the N260 with the shunt dis-engaged, re-engage the shunt, and then record this new calibration number. Be sure to record that this cal number is valid for HIGH GAIN and CALIBRATION only. Return the GAIN switch to the LOW position for normal operation. This cal number will be exactly 10 times the value recorded in the LOW GAIN position. Disengage the shunt before operating the press.

An operating mode may now be selected.

G. COMPUTER INTERFACE HOOKUP - see figure 5 and 6

The N260 can be connected to a computer using the built-in RS422/RS485 serial interface. Connection is made with a 5 pin connector (like sensor input) located at the right edge of the main PC board. This connector is labeled - T + GND - R + .

1. RS422/RS485 INTERFACES

The wires to the computer should consist of three twisted pairs with an overall shield. We recommend BELDEN #8103 cable for this application. One pair is connected to the + and - transmit (T) terminals, a second pair connects to the + and - receive (R) terminals, and the third pair connects to the center (GND) ground terminal. The shield connects to other shields in the daisy chain and then floats at the N260. The transmit terminals are outputs from the N260 to the computer while the receive terminals are inputs from the computer to the N260. The "+" is the non-inverting terminal and "-" is the inverting terminal.

2. RS232 INTERFACES

This connection is made to the computer with a single pair of shielded wires. The terminal labeled -T is the transmit line from the N260 to the computer. The terminal labeled -R is the receive line from the computer to the N260. The shield can be connected to the center (GND) terminal.

3. SETUP PARAMETERS

The N260 transmits data to the computer in blocks. Traditional modem signals are not used - therefore the computer must be able to accept data from the N260 continuously at the speed selected for the interface. Likewise the N260 expects data to come from the computer continuously as a block with no dead time between characters. This must be considered when selecting the baud rate.

* = FACTORY SETTING

The last setting needed to complete the computer hookup is the address selection. When using RS422/RS485, up to 32 N260s may be daisy-chained on the same serial line. To do this, the computer must know how to uniquely identify each N260 on the line. This is accomplished by assigning each N260 on a particular line a five digit binary address of 0 to 31. DIP switch SW11 selects this address. SW11 is located just above the connection to the computer at the right edge of the main PC board.

Switches 4-8 of SW11 select this address. The following table shows a few examples of the right switch settings for various addresses. DO NOT SELECT THE SAME ADDRESS FOR MORE THAN ONE N260 ON EACH RS422/RS485 LINE.

N260 ADDRESS	SW11-4	SW11-5	SW11-6	SW11-7	SW11-8
0	UP	UP	UP	UP	UP
3	UP	UP	UP	DOWN	DOWN
7	UP	UP	DOWN	DOWN	DOWN
12	UP	DOWN	DOWN	UP	UP
17	DOWN	UP	UP	UP	DOWN
19	DOWN	UP	UP	DOWN	DOWN
31	DOWN	DOWN	DOWN	DOWN	DOWN

NOTE - Be sure to leave the switches SW10-1 thru SW10-4 set as they are from the factory. These switches control the serial interface between the main board and the keyboard. These should be left set as follows: SW10-1=DOWN, SW10-2,SW10-3,SW10-4=UP

IV. TROUBLESHOOTING INFORMATION

A. USING THE OUTPUT JACK - see figure 4

The N260 has an analog track output signal for each channel. This output is located in the lower middle section of the main PC board. There are two rows of pins: the front (lower) row of pins is the analog output for the channels starting with channel 0 at the left end; the rear (upper) row of pins is the signal ground. These pins are such that scope probe may be clipped to the pin or a mating connector may be attached to all pins for sending the signals to a recorder, etc.

The signal level is 0 volts when the channel is balanced to zero in the no- load condition. A capacity load represents a positive change of 2.5 volts. The output impedance is 1000 ohms. Due to temperature changes in the sensing devices the no-load signal will drift causing small shifts in the output voltage at the output jacks. The span, however (2.5V=capacity), will remain constant.

B. SYMPTOMS AND SOLUTIONS

DISPLAY WILL NOT LIGHT

1. Check AC power to N260 - 115VAC +-15% 50/60 Hz.
2. Check fuse
3. Check for loose cables between chassis and display board,etc.
4. Check DIP switch and jumpers on keyboard
5. Check DIP switch and jumpers on main board
6. Check power to PC boards - +5VDC, +-15VDC, +-12VDC

MEMORY LOST WHEN POWER LOST

1. Check battery - (must be greater than 2.5 VDC)
2. Check 50 pin ribbon cable from power PC to main PC

Calibration Procedure for N260 Monitors

RECORD ALL SERIAL NUMBERS

Record all the serial numbers on the calibration sheet which can be found on the last page. These include:

- Press Serial Numbers
- Sensor Serial Numbers
- Monitor Serial Numbers
- Auto Cell Serial Numbers

TIGHTEN ALL THE SENSORS

Check the torque and the location of each sensor. To insure proper location, refer to the front panel of your N260. (See Fig. 1 & 2)

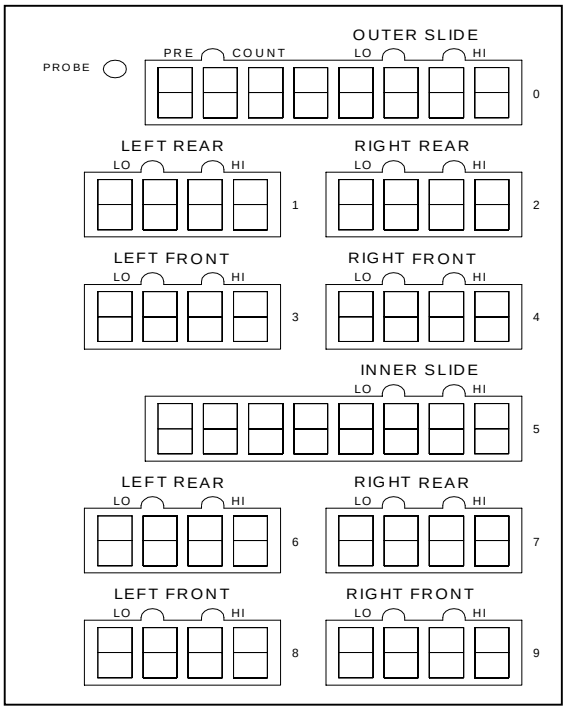


Figure 1: N268 Front Panel

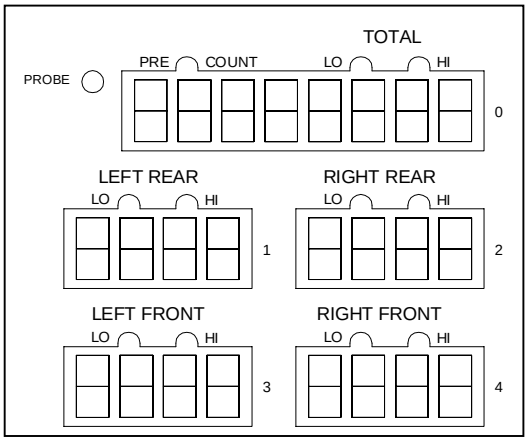


Figure 2: N26 Front Panel

CHECK SENSOR CABLES AND SHIELDS

Make certain all sensor cables and shields are inserted properly in the Phoenix Connectors.
(See Fig. 3)

(Note: You will not receive a proper signal if the shield and cable are inserted incorrectly).

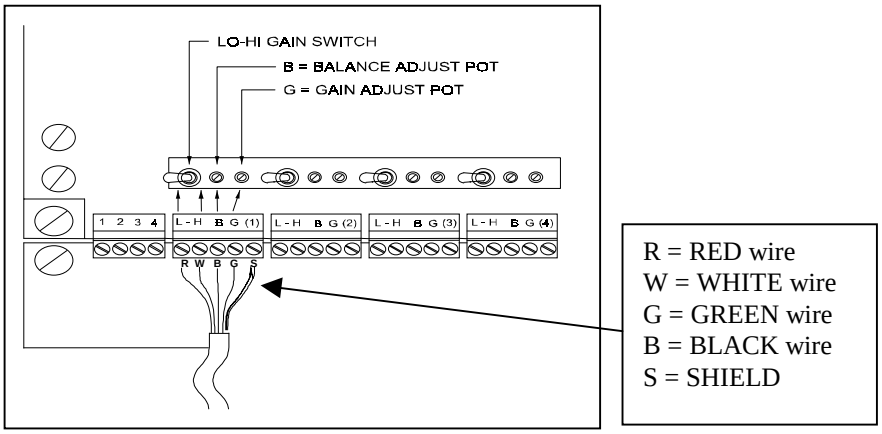


Figure 3: Proper Cable and Shield hook-up

STEPS FOR CALIBRATING

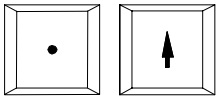
1. SET THE PRESS CAPACITY INTO THE MONITOR

- Press capacity is the tonnage rating of the press.
- The capacity value must be set into the monitor before the calibration can be done.

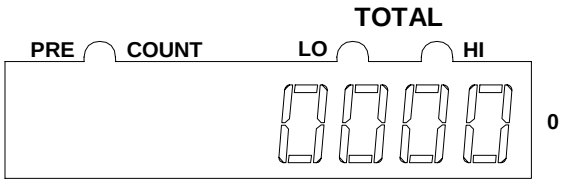
A. Press the HIGH key three times:

B. Press the 0 key to select channel 0:

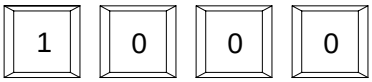
Note: If you do not want a decimal point. Press the decimal point key and the up key until a zero appears. Then go to step F and G. Then start with step A again to enter capacity



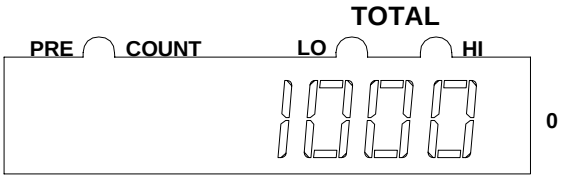
C. You will see Channel zero:



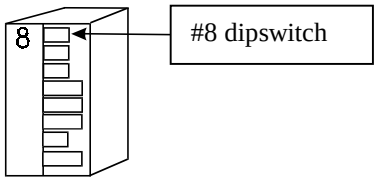
D. Type in your press Capacity.
For example: If you have a 1000 ton press, enter:



E. For a 1000 ton press,
Cannel 0 should show:



F. After you have entered your capacity, toggle the #8 dipswitch on the side of the key board on (down) and off (up):

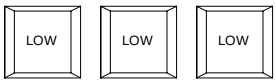


G. Then press the ENTER key:

2. SET AND CHECK THRESHOLD

- Your threshold should be around 6-10% percent of your set press capacity. For example if you have a 1000 ton capacity your threshold should read from 60-100.
- IF YOU HAVE A RESOLVER, THEN THE THRESHOLD IS SET TO PRESS CAPACITY. (See Resolver hookup instructions for more information)
- If you are triggering from a probe, the threshold is set to 0.

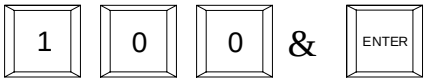
A. To find the threshold press the LOW key three times:



B. To select channel 0 press:

C. Input your desired threshold on the keyboard and press ENTER

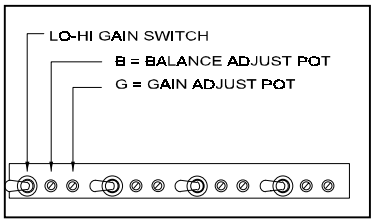
For Example on a 100-ton press, you would enter:



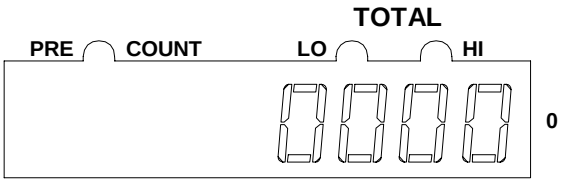
3. BALANCE ALL CHANNELS TO ZERO

A. Press the TRACK key:

B. Adjust all channels to zero by turning the balance pot:



C. All displays should show zero when you are done:



D. To return to normal mode press the PEAK key:

4. FIND THE SHUT HEIGHT OF THE PRESS

Jog the press until the ram is at bottom dead center (BDC) or 180 degrees without any Auto Cells or the die in the press. Determine the amount of spacers needed with your Auto Cells. Cycle the press without Auto Cells to insure correct height.

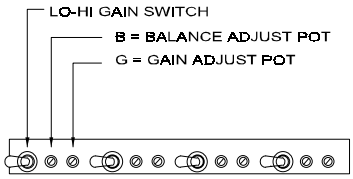
5. POSITION AUTO CELLS IN THE PRESS

All cells should be equal distance from the sides and front and rear. For example 12 inches from the sides, 10 inches from the front and rear.
Cycle the press without hitting the cells first.
Place cardboard on the top and bottom of the cells.

6. CYCLE THE PRESS AND HIT THE AUTO CELLS

7. ADJUST THE GAIN TO MATCH AUTO CELLS

A. After each stroke determine if you need to raise your gain depending on what your tonnage is reading on the load cells. For example, if your tonnage is reading lower on the N260, then turn the gain pot clockwise. Cycle the press. Now examine the readings. This process may take a little time.



(Note: To speed up your calibration process, use this formula:

$$\left(\frac{\text{Auto Cell tonnage}}{\text{Tonnage monitor reading}}\right) \text{ X old calibration \# = new calibration \#}$$

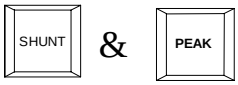
B. Make no further gain adjustments.

8. RECORD THE CALIBRATION NUMBERS

A. Press TRACK to re-balance all channels to zero: 

B. Press SHUNT to read calibration numbers: 

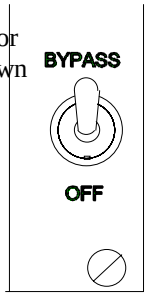
C. Write the numbers from each channel on the press calibration data sheet.

D. Press SHUNT and then PEAK to return to normal operating mode: 

9. MAKE A LINEARITY CHECK

Raise the shut-height in .020 to .030 inch increments to decrease tonnage. Next cycle the press and impact on the load cells. Compare the tonnage applied to the Auto Cells to the tonnage displayed by the monitor. These values should be documented.

10. CHECK TO MAKE CERTAIN THAT ALARMS STOP THE PRESS



- Locate the BYPASS toggle switch near the lower right corner of the control board. For the monitor to stop the press when an alarm trips, the toggle switch must be in the down position. To prevent an alarm from stopping the press, the switch must be in the up (bypass) position.

A. To test the switch, turn off the BYPASS (toggle down). Alarms are active.

B. Press RESET: 

C. Create a small overload condition and cycle the press.
The press should stop at top center.

D. Pull the fuse to see if the press cycles. It should not cycle.

E. Now toggle the switch up to BYPASS. It should allow the press to cycle.

F. When you have completed this test return the BYPASS to off (down).

(Note: When the bypass switch is in the up position there is NO press or die protection.)

11. CALIBRATION IS COMPLETE

INTRODUCTION

The Model N260 series instruments represent the state of the art in load monitors. The standard model instruments have been in use for several years in major stamping plants. This AUTO-SET model is primarily for production monitoring. It can learn a forming process and automatically adjust the working tonnage upper and lower control limits (alarm trip-point levels).

AUTOMATIC AND MANUAL OPERATION

Whenever any change is made to a press, it generally means the press working-tonnage will change. All protective alarm trip-points must be readjusted manually if the press is equipped with a standard tonnage meter or load monitor.

> **EXAMPLE:** Suppose you were using a standard load monitor and were forming a product at 100 tons. Suppose you want the alarms to trip 20 tons higher and 20 tons lower than the 100 ton working tonnage. You would set the HIGH alarms to trip at 120 tons. You would set the LOW alarms to trip at 80 tons. Suppose you made some changes in the press or tooling and began to form parts at 80 tons. Obviously, your alarms are set wrong. To maintain the original ± 20 ton differential you would need to adjust the high alarms manually to trip at 100 tons and the low alarms to trip at 60 tons.

This instrument is called a “smart” Production Monitor because it makes alarm-setting much faster and easier. It has an automatic alarm-setting mode. All you need to do is decide at what percentage above or below the working tonnage the alarms should trip. Once you make that decision, the alarm trip-points will be set automatically whenever you make changes to the press or start a new job. The exact alarm trip-point tonnage will automatically be re-calculated and adjusted properly, regardless of the new working tonnage level.

> **EXAMPLE:** Suppose we started with a 100 ton working tonnage and set the alarms to trip at ± 20 tons that is ± 20% of the working tonnage. Suppose you change the press and your new forming tonnage becomes 80 tons. The AUTO-SET alarm setting function would automatically adjust the monitor alarms to trip at 96 tons and 64 tons. All that is done with no re-calculating or knob turning by the press operator.

"LEARNING" THE WORKING TONNAGE

This monitor has the ability to “learn” a press operation and automatically set alarms to trip if the tonnage deviates beyond acceptable limits. It does this by measuring and remembering the working tonnage of eight press strokes. The instrument then calculates the average working tonnage to establish a "benchmark" or “baseline”. This benchmark represents the ideal working tonnage. If each subsequent part is formed at this ideal benchmark tonnage (the average tonnage), you will know that the forming operation is running properly.

TONNAGE DEVIATION WHILE FORMING PARTS

No press or forming operation is perfect. There will generally be working-tonnage variations from stroke to stroke. Suppose that a good part can be produced only at tonnages between 90 tons to 110 tons.

That means the ideal average working-tonnage is about 100 tons. It also means that if the tonnage goes 10% higher or 10% lower than the ideal tonnage, the formed part is probably out of tolerance.

The monitor has built-in adjustable alarms that will trip if the forming-tonnage deviates too much and exceeds the pre-selected limits. There is a built-in alarm relay that will operate when any alarm trips. You may use this relay to turn on a warning light, sound an audible alarm, and/or stop the press.

You may “program” this monitor so the alarms will trip at various percentages of working-tonnage deviation. For example, you could instruct the monitor to trip an alarm if the forming tonnage deviates as little as ± 5%. Most press operations vary more than that. You may broaden the monitoring tolerance by instructing the monitor to trip an alarm only if the forming tonnage deviates more than ± 45% from the ideal tonnage. The working-tonnage tolerance of your products probably is somewhere between the two extremes of ± 5% and ± 45%.

This instrument monitors the tonnage deviation on the entire press and the deviation in tonnage on each press corner. You may pick one acceptable amount of deviation (in percent) and have it apply to the entire press. If you prefer, you may set different deviation percentage numbers for each corner of the press. All alarms may be adjusted to trip at deviation percentages from ± 5% to ± 45% in 5% increments.

BUILT-IN ALARMS

FIVE GROUPS OF ALARMS

There are five overload/underload groups of alarms in this monitor:

1) For press overload protection there are gross-overload alarms called "CAPACITY" alarms. There is one gross-overload alarm for each press corner. They will trip if the press exerts tonnage which exceeds the rated capacity of the press corner. There are TOTAL gross-overload alarms that will trip if the press exerts tonnage which exceeds the total rated capacity of the press. The CAPACITY alarms are adjusted when the monitor is installed on the press and normally they don't need readjustment.

2) There is one adjustable HIGH alarm for each press corner. One (or more) of these alarms will trip if the tonnage on its corner of the press goes too high.

3) There is one adjustable LOW alarm for each press corner. These alarms monitor the lowest level of the working tonnage. One (or more) of these alarms will trip if the tonnage on its corner of the press does not get high enough to form a good part.

4) There is one HIGH-TOTAL alarm that will trip if the total working tonnage exerted by the press increases beyond pre-selected limits.

5) There is one LOW-TOTAL alarm that will trip if the total working tonnage exerted by the press does not reach a pre-selected minimum level.

The trip-point levels of the working tonnage alarms (HIGH, LOW, HIGH-TOTAL, LOW-TOTAL) are adjustable in two ways:

1) **AUTOMATIC ALARM ADJUSTMENT.** The alarms will automatically be adjusted to a pre-selected percentage above and below a "benchmark" average working tonnage. This occurs when the monitor is operating in the AUTO-SET mode and the keyswitch is put to the RUN position.

2) **MANUAL ALARM ADJUSTMENT.** The alarm trip-points may be manually adjusted when the monitor is not in the “AUTO-SET” mode. Manual alarm adjustment is covered in another part of this manual.

ENTERING WORKING TONNAGE ALARM TOLERANCES

You may adjust the alarm tolerances of any channel from 5% to 45% in 5% increments, this is done by using the up/down arrow keys. Pressing an arrow key once will change the tolerance by 5%.

You can also set either the HIGH or LOW alarms to a zero-tolerance amount.

-If you set the HIGH alarms to 0%, the alarms will be bypassed. That is, an alarm will not trip until the forming tonnage reaches a gross-overload (at press capacity). This condition should be avoided.

-You may bypass the low alarms by setting them to 0%. That is the LOW alarms are bypassed and won't trip no matter how low the forming tonnage is. For an example, LOW alarms might be tripping because of empty stations or poor stock. You may either set the LOW alarms to 0% or use the BYPASS function of the monitor. See standard manual sections for details of the BYPASS function.

OUTSIDE CONTROLS AND FUNCTIONS

There is a keyswitch on the front of the instrument. It is labeled SET-UP, RUN and RESET. Each switch position selects a different operating mode for the monitor.

SET-UP KEY POSITION

- The SET-UP keyswitch position is for use during press setup and whenever you want to turn off the automatic “AUTO-SET” function of the monitor.

- The benchmark tonnage memory will not be erased when you put the keyswitch into the SET-UP position. However, it will be erased eight press strokes after you turn the keyswitch to the RUN position.

- All working-tonnage alarms (HIGH/LOW alarms) will be bypassed in the SET-UP position. Only the “CAPACITY” (press-overload) alarms are operational. Only a gross overload, in excess of press capacity, will operate the alarm relay.

- The digital displays will show the current working tonnage levels of each press corner and the total working tonnage exerted by the press. The displays will update when new tonnage levels are detected.

-If a computer is interfaced to the monitor, the computer cannot take the instrument out of the SET-UP mode.

- The trip-points of the working tonnage alarms (HIGH/LOW alarms set-points) can be programmed either at the monitor or at the computer when the keyswitch is in the SET-UP position.

- If the monitor is interfaced to a computer, the computer can poll data from the monitor and make parameter changes in the instrument.

RUN KEY POSITION

- The working tonnage alarms (HIGH/LOW alarms) will remain inhibited and will not be allowed to trip during the first eight press strokes. The CAPACITY alarms (press-overload alarms) remain operational so a gross overload (in excess of press capacity) will operate the alarm relay.

- During the first eight strokes, the instrument will be learning the average tonnage of the forming operation. The tonnage level of eight press strokes will be measured. The monitor will calculate and remember what the average tonnage was. This average tonnage will be the new benchmark.

- The old benchmark will be erased and replaced with the new benchmark tonnage which was calculated during the first eight strokes. The forming tonnage of any subsequent parts will automatically be compared to this benchmark (ideal) tonnage.

- The working-tonnage alarms (HIGH/LOW alarms) will automatically be adjusted to trip at a specific tonnage above and below the new benchmark (average tonnage level). That specific tonnage is determined by what acceptable-percentage-of-deviation you programmed into the instrument.

- You may change the percentage of tonnage-deviation programming without putting the keyswitch back into the SET-UP position.

RESET KEY-POSITION

- The RESET key position is spring loaded. Turning the keyswitch to RESET position will re-set all tripped alarms. NOTE: Pressing this RESET button can not cause the press to start. The monitor alarm-relay is wired in series with the press top-stop circuit. It will be necessary to re-start the press manually after the tripped alarms are re-set.

- Turning the keyswitch to the RESET position will turn off the SETUP LED and remove the N260 from SETUP mode. If you need to LEARN again, move the switch from RESET to SETUP and then to RUN.

BENCHMARK PUSHBUTTON

The rubber-covered BENCHMARK pushbutton operates a sequencing circuit to cause the TOTAL and HI/LO digital displays to show various tonnages. The tonnage will remain displayed as long as you keep the button pressed in. The two red LED lights above each digital display shows which tonnage is being displayed.

- **HI AND LO LIGHTS OVER DIGITAL DISPLAYS.** When both the HI and LO lights are on, the digital displays will be showing the benchmark tonnage for the entire press (TOTAL) and the individual corners of the press. The benchmark tonnage is the average tonnage that was stored in memory when the keyswitch was put into the RUN position.

- **LO LED LIGHTS ON.** When the LO lights are on, the digital displays will be showing the minimum tonnage that the press must exert as the part is formed. The tonnage must reach the displayed tonnage levels or the alarm will trip.

- **HI LED LIGHTS ON.** When the HI lights are on, the digital displays will be showing the maximum tonnage that the press should exert as the part is formed. The alarm will trip if the forming tonnage exceeds the alarm trip-point which is displayed.

INFORMATION SHOWN BY THE DIGITAL DISPLAYS

During routine monitoring in the automatic RUN mode the digital displays will show the high and low working tonnage levels of each press corner. The TOTAL display will show the total working tonnage exerted by the press.

You may press pushbuttons to display and change a variety of alarm trip-points when the keyswitch is in either the RUN or the SET-UP position. There is one round rubber-covered pushbutton labeled BENCHMARK. You may also use some pushbuttons on the computer-style keyboard inside the monitor.

- When no buttons are being pressed, the digital displays will be showing the actual working tonnage as the press forms parts. If the press is not running, the tonnage shown usually will be that of the last press impact.

- While you are pressing the BENCHMARK pushbutton, the digital displays will be showing one of three things:

  1) HIGH alarm trip-point tonnage (HI lights on).
  2) LOW alarm trip-point tonnage (LO lights on).
  3) The benchmark average tonnage (HI and LO lights on).

- When you press a series of keys on the keyboard, the digital displays will show the percentage of deviation that will cause various alarms to trip.

USING THE KEYBOARD IN AUTOMATIC ("AUTO-SET") MODE

SYMBOLS USED IN THIS ADDENDUM

The monitor has a computer style keyboard which can be used to give instructions to the monitor. The following symbols and sequences are used in this addendum:

<%> <HIGH>
Pressing the <%> key, then the <HIGH> key will display the HIGH alarm trip-point in percent.

<%> <LOW>
Pressing the <%> key, then the <LOW> key will display the LOW alarm trip-point in percent.

<ARROWS>
This means to use either an up-arrow or a down-arrow key. When the monitor is in the automatic (AUTO-SET) mode, the alarm trip-points may be raised or lowered by using the up/down arrow keys.

<CHANNEL>
This means to use the numerical keyboard to input the channel number into the monitor. There is a numbered digital display for each channel and one for TOTAL.

A four channel system has displays numbered 1,2,3,4 and the TOTAL display is number zero (0). An eight-channel system has four displays labeled OUTER 1,2,3,4 and the TOTAL is display number zero (0). It also has four displays labeled INNER 6,7,8,9 and the TOTAL display is number five (5).

<DECIMAL-POINT>
This means to press the decimal point on the numerical keyboard.

<ENTER>
The ENTER key is used at the end of a command sequence to cause the information to be stored in memory.

You may press various key-sequences to control the monitor functions. For example, to display the percentage of deviation at which the HIGH alarms will trip, you can press the % key and then the key marked HIGH. In this addendum, this sequence is written as < % > <HIGH>. Another example would be <%> <LOW> which means "display the percentage of deviation at which the low alarms will trip".

PUSHBUTTONS WHICH MAY BE USED WHILE THE PRESS IS RUNNING

- You may press the BENCHMARK button at any time without causing an alarm to trip.

-You may use a <%> <HIGH> or <%> <LOW> keyboard sequence at anytime to display alarm trip-points.

-After a <%> <HIGH> or <%> <LOW> sequence you may use the <ARROW> keys to change the alarm trip-points.

NOTE: Even though you select a percentage that is too close to the working tonnage, there is no chance of causing a press shutdown until you press the <ENTER> key. The new alarm trip-points won't be calculated and won't take effect until you press the <ENTER> key.

CAUTIONS TO OBSERVE WHILE IN AUTO-SET AUTOMATIC MODE

- All keyboard functions that are active in the manual mode of operation are also active in the automatic mode. Refer to the standard manual for details of how the various keys function.

- Don't adjust the alarm trip-points by entering tonnage numbers as you would do in the manual mode of operation. If you do it by mistake, merely use the <%> <ENTER> sequence to get back to monitoring property.

AUTO-SET OPERATING INSTRUCTIONS

TWO TYPES OF N260 SERIES MONITORS

These instructions are for both the four channel and eight channel series N260 monitors. The eight channel instrument is designed for use on double action presses. Four of the eight channels are dedicated to the outer slide. Four are dedicated to the inner slide.

FOUR CHANNEL MONITORS. Four channel N260 series monitors are primarily for use on single action straight side presses. There are five digital displays. There is one digital display for each press corner and they are numbered 1,2,3,4. There is one TOTAL digital display labeled zero (0).

EIGHT CHANNEL MONITORS. Eight channel N260 series monitors are primarily for use on double action presses. Four of the channels are labeled OUTER and are used to monitor the outer slide. The other four channels are for monitoring the inner slide and are labeled INNER.

-OUTER SLIDE. Digital display number zero (0) is the TOTAL display for the outer slide. Digital displays 1,2,3,4 are the channels dedicated to the four corners of the outer slide.

-INNER SLIDE. Digital display number five (5) is the TOTAL display for the inner slide. Digital displays 6,7,8,9 are the four channels dedicated to the four corners of the inner slide.

WORKING WITH HIGH ALARM TRIP-POINTS

- **TO READ HIGH ALARM TRIP-POINTS.** Use sequence: < % > <HIGH>

- **TO ADJUST ALL HIGH ALARM TRIP-POINTS.** Use sequence: <%> <HIGH> <ARROWS> (select percentage) press <ENTER> key.

NOTE: The alarm trip-points may be adjusted while the press is running. The new trip-points will not control the monitor until you press the <ENTER> key. Don't set the trip-points too close to the working tonnage.

-**TO ADJUST INDIVIDUAL HIGH ALARM TRIP-POINTS.** <%> <HIGH> <CHANNEL> <ARROWS> <ENTER>.

NOTE: <CHANNEL> means the channel number of the digital display that you want to change. For example, if you want to change the HIGH tolerance of channel three, you would use the sequence < % > < HIGH > < #3 on the numerical keyboard > < ARROWS to change percentage > <ENTER>.

WORKING WITH LOW ALARM TRIP-POINTS

-**TO READ LOW ALARM TRIP-POINTS.** Use sequence: <%> <LOW>

-**TO ADJUST ALL LOW ALARM TRIP-POINTS.** Use sequence: <%> <LOW> <ARROWS> (select percentage) press <ENTER> key.

NOTE: The alarm trip-points may be adjusted while the press is running. The new trip-points will not control the monitor until you press the <ENTER> key. Don't set the trip-points too close to the working tonnage.

- **TO ADJUST INDIVIDUAL LOW ALARM TRIP-POINTS.** Use sequence: <%> <LOW> <CHANNEL> <ARROWS> (select percentage) press <ENTER> key.

NOTE: <CHANNEL> means the channel number of the digital display that you want to change. For example, if you want to change the LOW tolerance of channel 3, you would use the sequence <%> <LOW> <#3 on the numerical keyboard> <ARROWS to change percentage> <ENTER>.

TO BEGIN AUTOMATIC MONITORING

- Instrument power on. Press stopped. Turn keyswitch to RESET position and then to SET-UP position.

- Open enclosure door and press the following key sequence: <LOW> <COUNT> <DECIMAL- POINT>. Use the <ARROW> keys to show number 2 in the upper left digital display. Press <ENTER> key.

NOTE: The number 2 will turn off and the letter L will be shown in the upper left digital display.

- Select new alarm trip-points if necessary. NOTE: For details, see sections titled "WORKING WITH ALARM TRIP-POINTS".

- Run press and produce ideal parts. Turn keyswitch to RUN position

- After eight press strokes the tonnage-averaging will be complete. The new benchmark will be stored in memory. The alarm trip-points will automatically be adjusted. The red SET-UP light inside the instrument will turn off.

TO READ ALARM TRIP-POINTS IN TONS INSTEAD OF PERCENT

A different tonnage will be displayed each time you press the BENCHMARK pushbutton. Press and hold the BENCHMARK pushbutton. See which light is on over the digital displays.

- HI light will be on when HIGH alarm trip-point tonnage is being displayed.

- LO light will be on when LOW alarm trip-point tonnage is being displayed.

TO DISPLAY BENCHMARK (AVERAGE) TONNAGE STORED IN MEMORY

- Press and release BENCHMARK pushbutton until both lights are turned on over the digital displays. If both HI and LO lights are on it means the digital displays are showing the stored benchmark (average) tonnage.

TO ERASE OLD BENCHMARK AND TAKE A NEW AVERAGE TONNAGE SAMPLE

Turn keyswitch to SET-UP position and then to RUN position. After eight press strokes a new benchmark (average) tonnage will be stored in memory.

TO RE-START PRESS AFTER TRIPPED ALARM SHUTDOWN

- Cure the problem that caused the alarm to trip.

- Turn keyswitch to RESET position and back to RUN position.

- Re-start the press. NOTE: Sometimes alarms will repeatedly trip while the press is getting up to speed or stations are being filled. In that case, hold the keyswitch in the RESET position until alarms are no longer being tripped. Don't turn the keyswitch to the SET-UP position unless you want the monitor to re-learn a new average tonnage.

TO PUT MONITOR INTO MANUAL MODE OF OPERATION

- Instrument power on. Press stopped.

- Open enclosure door and press the following key sequence: <LOW> <COUNT> <DECIMAL POINT>. Use <ARROW> keys to show number 0,1 or 3 in the upper left digital display. Press <ENTER> key. NOTE: see standard manual to make decision whether to use 0,1 or 3.

TO PUT MONITOR INTO AUTO-SET AUTOMATIC MODE OF OPERATION

- Instrument power on. Press stopped.

- Turn keyswitch to RESET position and then to SET-UP position.

- Open enclosure door and press the following key sequence: <LOW> <COUNT> -<DECEMAL- POINT>. Use the <ARROW> keys to show number 2 in the upper left digital display. Press <ENTER> key.

NOTE: After the <ENTER> key is pressed, the number 2 will turn off and a letter L will be shown by the upper left digital display.

IF EMPTY STATIONS OR POOR STOCK CAUSE LOW ALARMS TO TRIP

- **TO BYPASS ALL LOW ALARMS:** Use the sequence < % > <LOW> <ARROWS > (set all channels to zero) <ENTER>

- **TO BYPASS INDIVIDUAL CHANNEL ALARMS:** Use the sequence<%> <LOW> <CHANNEL>, <ARROWS> (set to zero) <ENTER>

USING THE SET-UP KEYSWITCH POSITION FOR DIE SETTING

- Put the keyswitch in the SET-UP position. The digital displays will be showing the actual impact- tonnage of each press stroke.

- Run the press to produce good parts when all press adjustments are complete.

- Turn the keyswitch to the RUN position when you are satisfied with the quality of the parts.

- Tonnage sampling will be complete after eight press strokes. The alarm trip-points will automatically be adjusted and the red SET-UP light will go off.