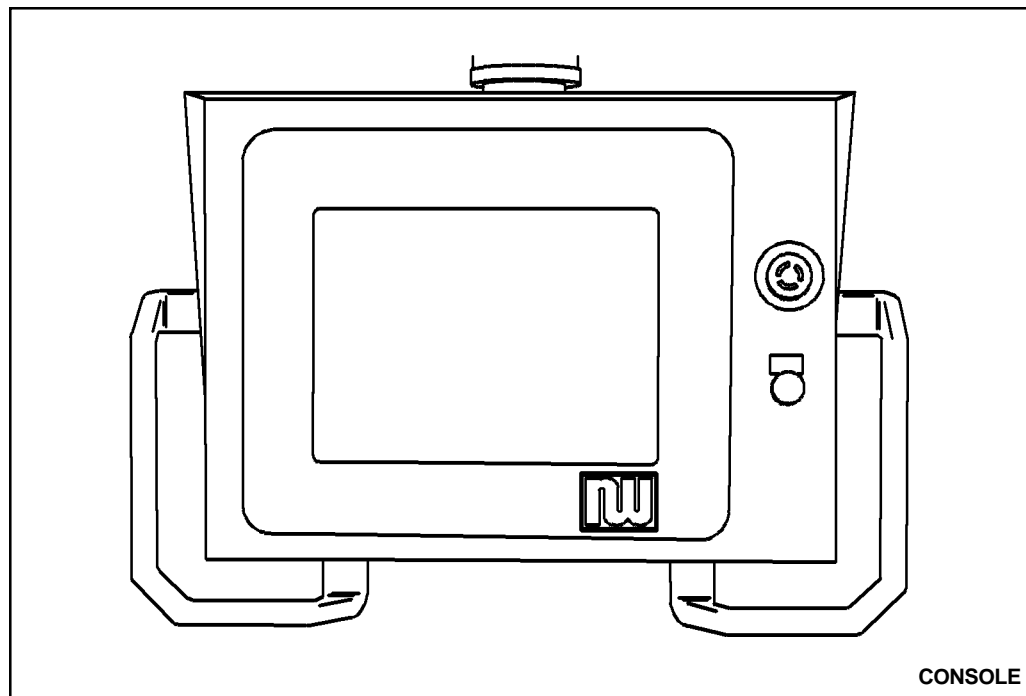


ROPER WHITNEY

ORION CONTROL SYSTEM

FOR CNC SHEET METAL BENDING MACHINES



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SECTION 1

GENERAL DESCRIPTION

The Orion Control System is a CNC control system which controls all the electronic functioning of the machine to which it is applied. It provides a means of controlling manufacturing functions, programming, setting machine and operational functions, and communicating with a central computer system or network.

OPERATION

Machine functions are controlled indirectly by a computer. The computer provides a means for creating and saving manufacturing programs, and also provides a location for saving machine performance parameters and limits. A programmable controller provides a communications link between the machine and the computer..

The operator can use previously stored programs for manufacturing operations, or he can produce programs to be used for a single manufacturing operation and then discarded.

PROGRAMMING

The programming features of the system enable the programmer to produce programs either by entering all operational data digitally, or by entering the same data using a combination of manual and graphic methods.

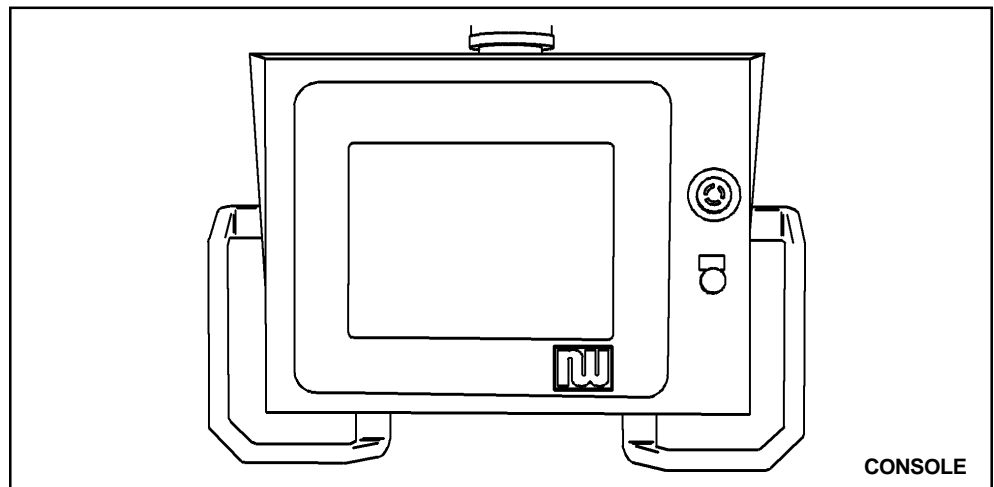


Figure 1-1: The Orion Control System Console

FILE MANAGEMENT

The file management features enable programmers and system managers to store and delete programs in the system memory, and to communicate with a central program storage system either through electronic connection or by means of floppy disks.

MACHINE PARAMETERS

The machine parameters features enable the system manager to set up and change various functional parameter values to suit the requirements of the manufacturing operations being performed.

**MACHINE
DIAGNOSTICS**

The machine diagnostics capabilities enable the system manager to operate the machine for troubleshooting purposes. This feature produces readouts of machine functions which will help pinpoint and eliminate performance problems with the machine. Diagnostic activities are normally carried out under the direction of factory technicians and may be done at long distance using telephone consultation. In some instances, if so equipped, the machine may be operated remotely by factory technicians.

SECTION 2

SPECIFICATIONS

The following specifications are applicable to the Orion Control System. If the specifications listed below vary from those appearing in the electrical or mechanical prints provided with the machine, the print specifications supersede this manual.

Table 2-1: Specifications

System Data

System Designation Orion
Operating System Windows 95 Base
Microprocessor Intel Pentium Processor
System Storage Internal Hard Drive

Controls Data

Mounting Console or Pendant
Integration Interactive with Physical Controls
Programmable Controller ICS
Operating Mode Automatic under Overall Machine Control
Auxiliary Modes File Management, Manual and Graphic Programming
Supervisory Mode Machine Parameters
Maintenance Modes Diagnostics, ICS Upgradeable

Data Capacities

Hard Drive 10 gigabytes
Programs 1 Million
Steps per Program x Lines
Text Information per Program 255 Characters

Communication

Program and Control Input Touch Screen
Bulk Input/Output 3-1/2-inch Floppy, CD rom
Network Compatibility Yes
External Access RS232 Port, Internal Modem
Baud Rate 56 k bd

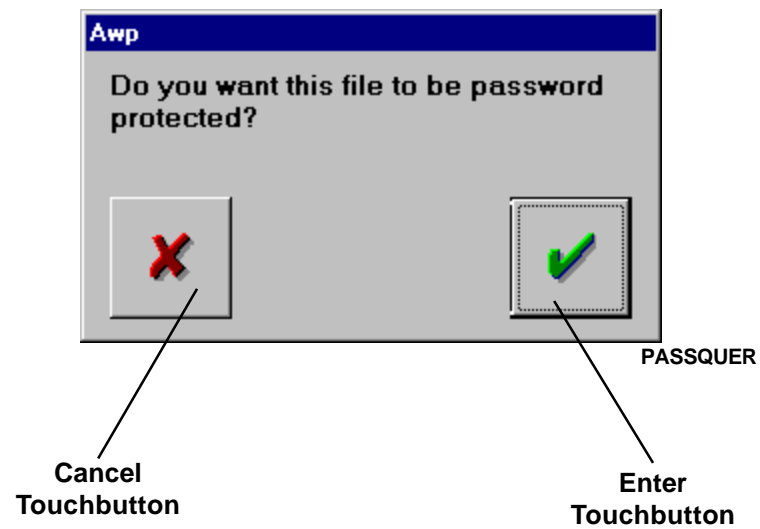


Figure 3-1. The Password Query Display

SECTION 3 SECURITY

SYSTEM PASSWORD

The Orion Control System has a system password which is set at the factory. It is provided to the appropriate customer personnel at the time of delivery. This password allows access to machine parameters and the ICS upgrade functions, but it prevents permanent changes to either the machine parameters or ICS functions by unauthorized personnel.

The password is case sensitive, so it must be entered with the exact combination of upper and lower case characters used when it was set.

The password is set in the machine parameters, and can be changed by anyone having access to that portion of the system. Instructions for changing this password are contained in Section 13, Machine Parameters.

PROGRAM PASSWORDS

In addition, each part program can be protected by its own password, which is set when the program is saved for the first time. Normally this feature is toggled off in the machine parameters. It can be toggled on by anyone having access to the machine parameters. Instructions for doing so are contained in Section 13, Machine Parameters.

Like the system password, program passwords permit the use and temporary modification of any program. However, any changes made on a temporary basis cannot be saved to the program file. This prevents the inadvertent modification of key programs saved in system memory.

If this feature is toggled on, the display shown in figure 3-1 will appear whenever a program is saved. If you do not wish to assign a password to the program, touch the Cancel Touchbutton. If you wish to assign a password, touch the enter Touchbutton and the Password Entry Screen shown in Figure 3-2 will appear.

CAUTION

**THE USE OF PASSWORDS ON PROGRAMS IS NOT
RECOMMENDED EXCEPT IN SITUATIONS WHERE EXTRA
SECURITY IS NEEDED.**

Establish only a limited number of passwords and use them sparingly. Use of many passwords, or a different password for each program, can be confusing, and lead to the inability to upgrade certain programs. Password protected programs cannot be deleted from the system without using the password.

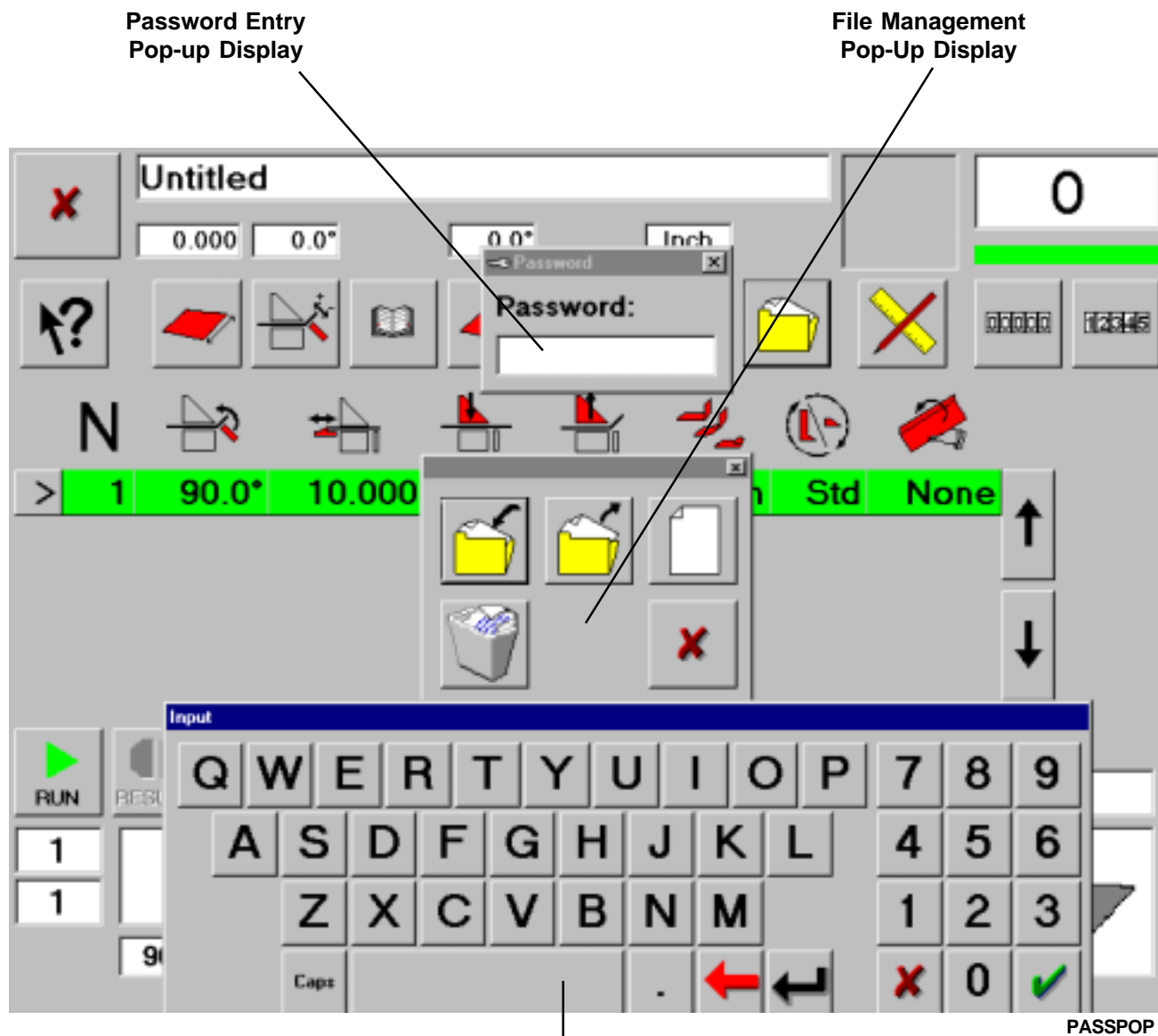


Figure 3-2. Program Password Pop-Up Displays

**ENTERING A
PROGRAM
PASSWORD**

Enter the desired password for the program using the Alphanumeric Keypad Display shown in Figure 3-2. (See the instructions with Figure 10-4 in Section 10, Manual Programming.) The password characters will appear in the Password Entry Pop-Up Display.

When the desired password has been entered, incorporate it into the program by touching the Enter Touchbutton. The pop-up displays will disappear and the save process will be completed.

**SAVING
CHANGES TO
A PASSWORD
PROTECTED
PROGRAM**

When saving changes to a password protected program, the same set of displays will appear. Enter the proper password, and the change process will proceed.

**DELETING A
PASSWORD
PROTECTED
PROGRAM**

When deleting a password protected program, the same set of displays will appear. Enter the proper password, and the delete process will proceed.

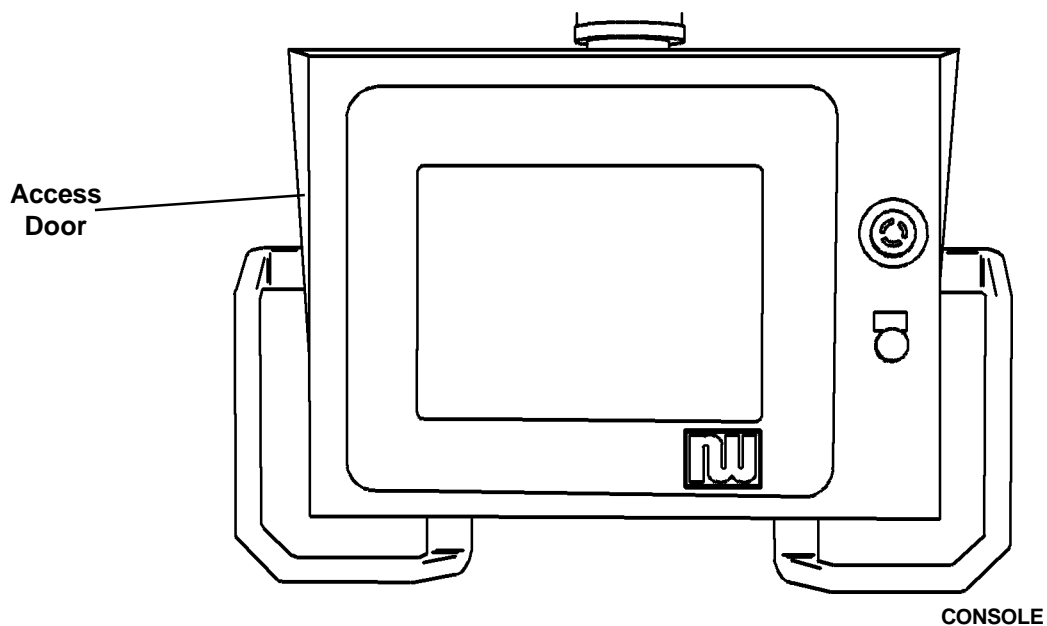


Figure 4-1. Location of the Computer Connection Panel

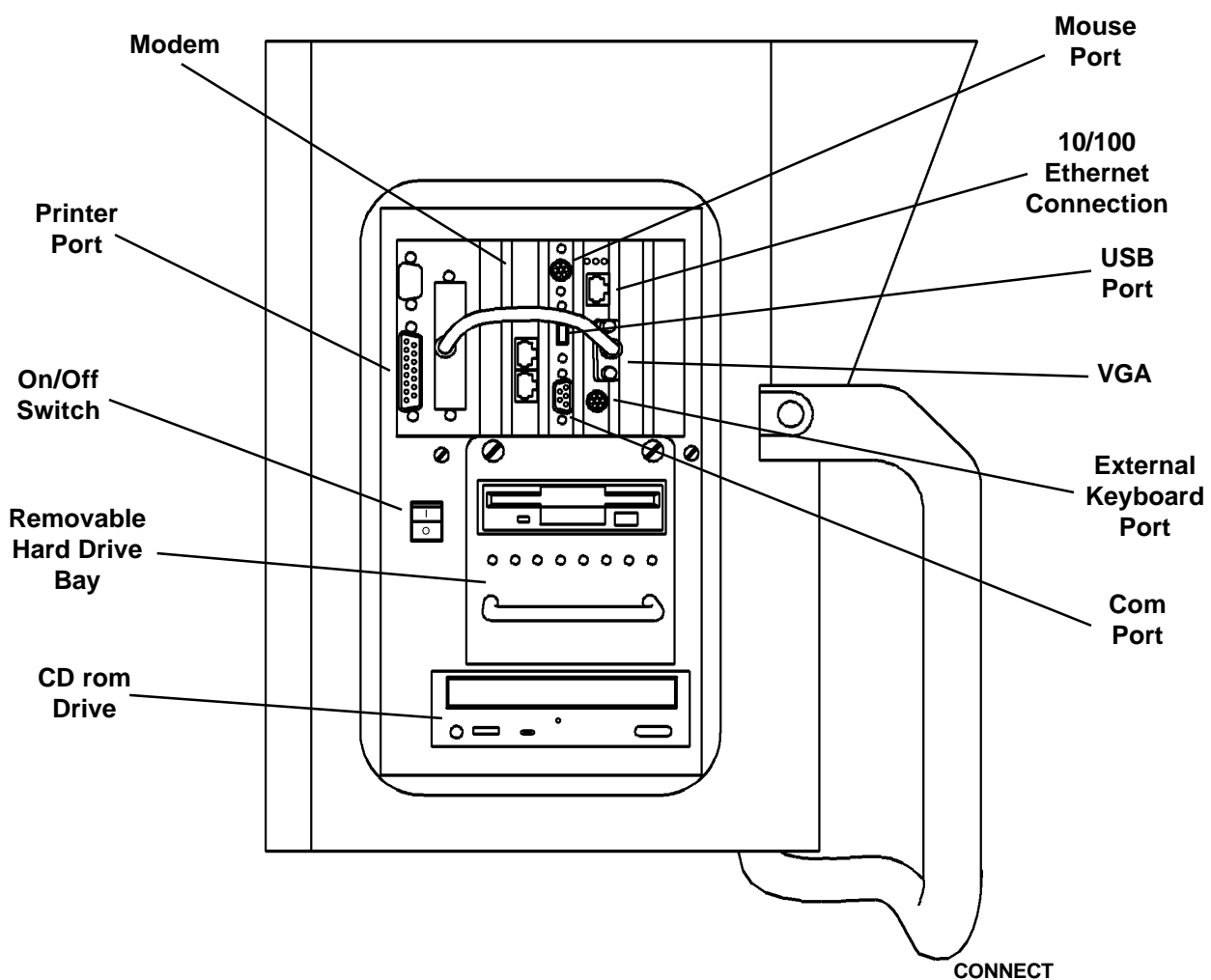


Figure 4-2. Location of the Various Computer Components

SECTION 4

NETWORK CONNECTION

The Orion Control System is capable of functioning when connected to a company network. Such a connection makes it possible to back up program files by copying them to network storage, and also makes it possible to share part programs between production machines.

NOTE

It is not necessary to connect the control system to a network in order to enable it to function. The system functions primarily as a stand-alone system controlling the machine on which it is mounted.

Because company networks vary greatly in configuration, it is not possible to provide instructions for connecting and operating the Orion Control System to a company network. Company technicians must work with Roper technical personnel to make network connections. Company technicians are also responsible for training company personnel in the functions of network connections.

Computer components and connections are located as shown in Figure 4-1, and identified in Figure 4-2.

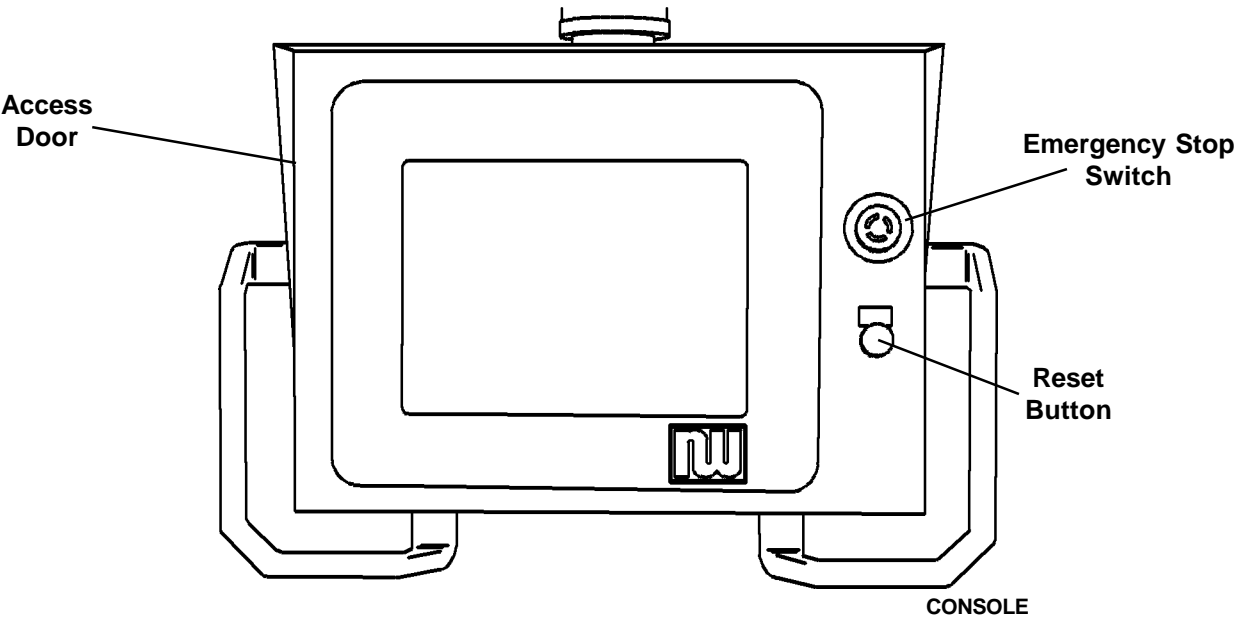


Figure 5-1. Disk Drive Access Door and Emergency Stop Switch

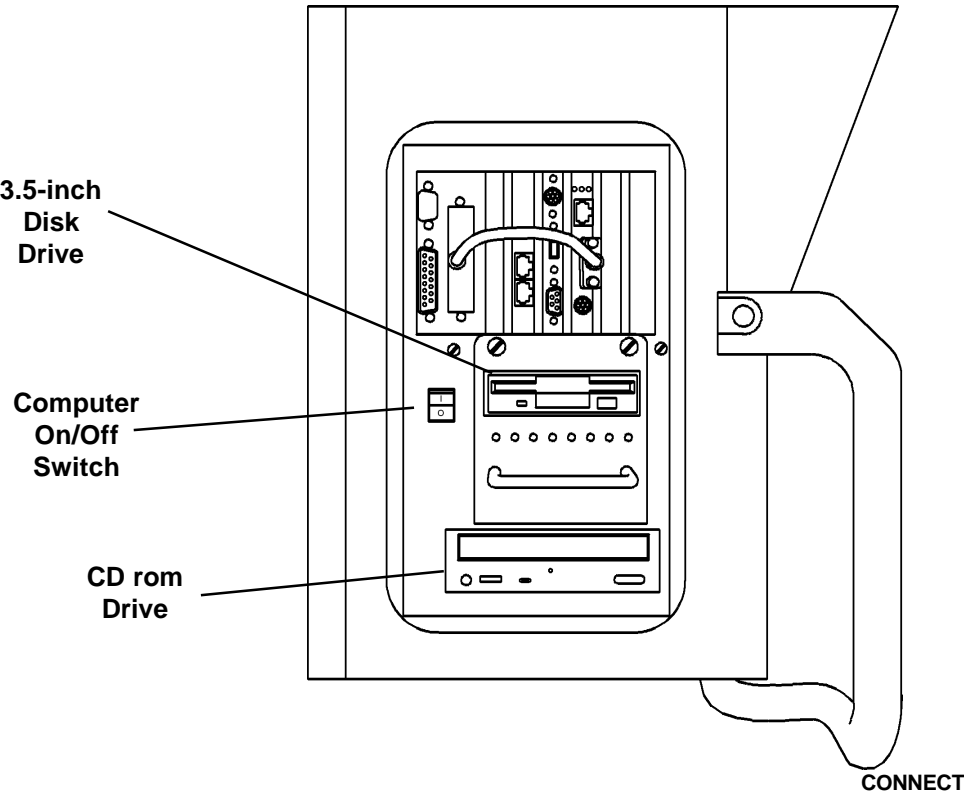


Figure 5-2. Location of the Computer Disk Drives and the Computer On/Off Switch

SECTION 5

START UP

BEFORE STARTING

Before starting the machine, open the door on the left-hand side of the display cabinet and check both disk drives to see that they are empty. Figure 5-2 shows the location of the disk drives. The computer with the Orion Control System should not be booted up from a disk, and some control systems are set up to boot up when machine power is turned on.

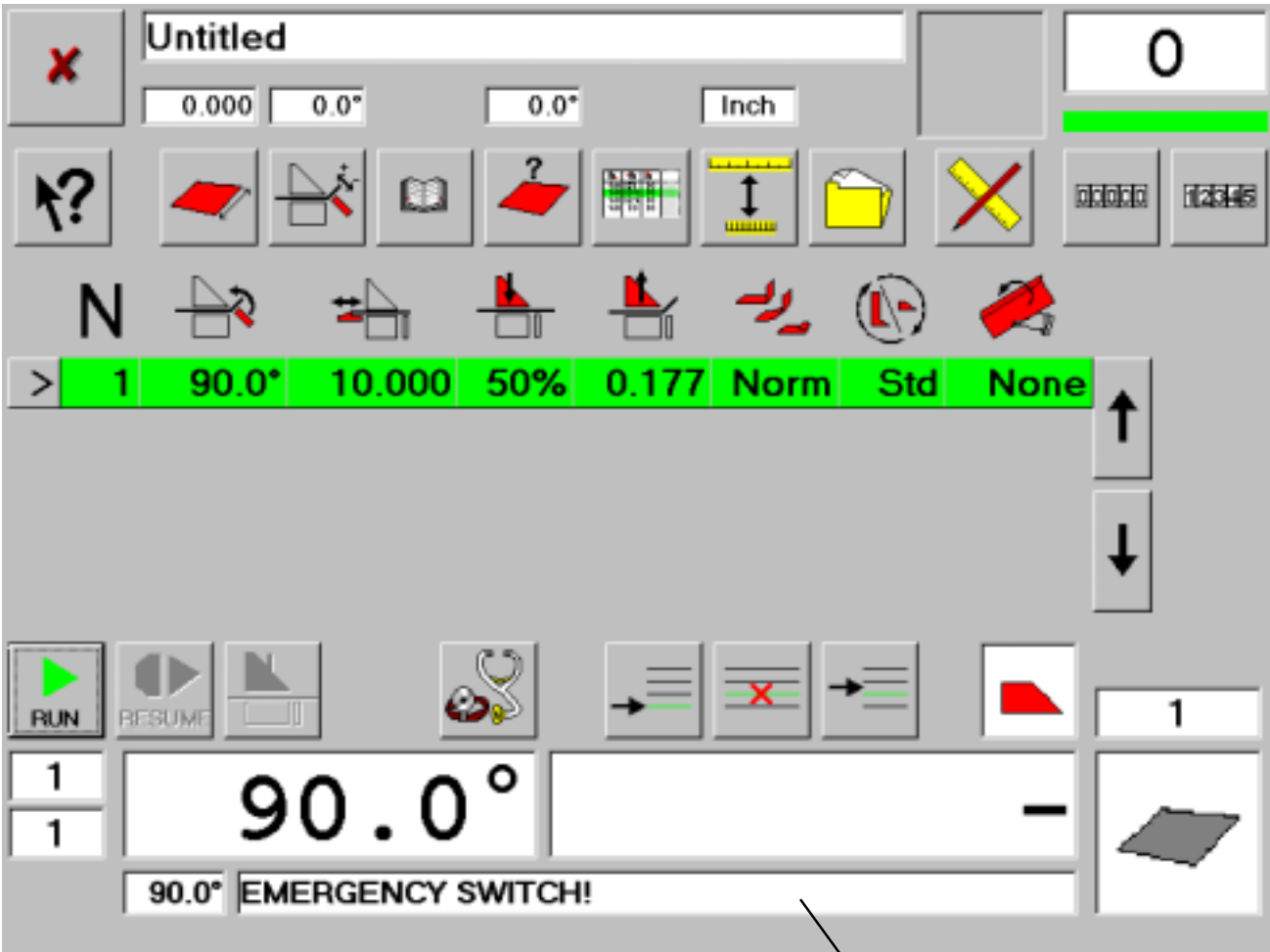
TURNING ON POWER

Power up the bending machine according to machine instructions. If the control system is set up to boot up automatically when the machine is powered up, it will begin its boot sequence at this time.

If the machine is set up so that the control system must be powered up separately, turn on the control system using the On/Off shown in Figure 5-2.

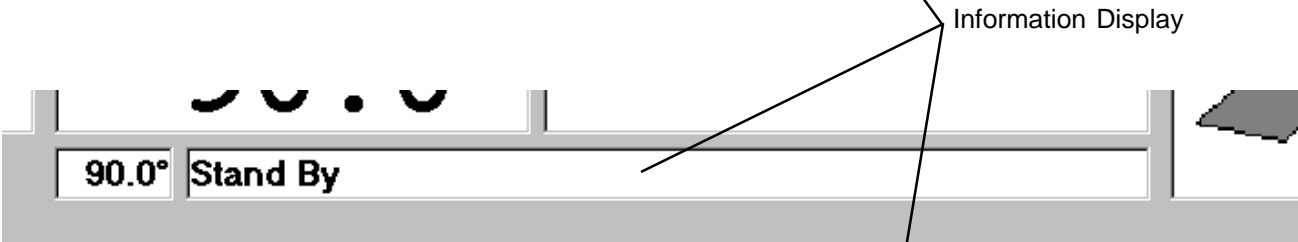
When the Orion Control system boots up, it displays the main screen shown in Figure 6-1 in Section 6. Mainscreen. Operation or programming can then proceed by calling up the Run/Programming Screen shown in Figure 7-1.

However, when the Run/Programming Screen is called up after an emergency stop, it displays the screen shown in Figure 5-3. The operator or programmer must then reset the backstop position prior to proceeding. Refer to Figure 5-3.



Run/Programming Screen after an Emergency Stop

START1



After the Emergency Stop Switch is Reset

START2



Preparation for Setting Backgauge

START3

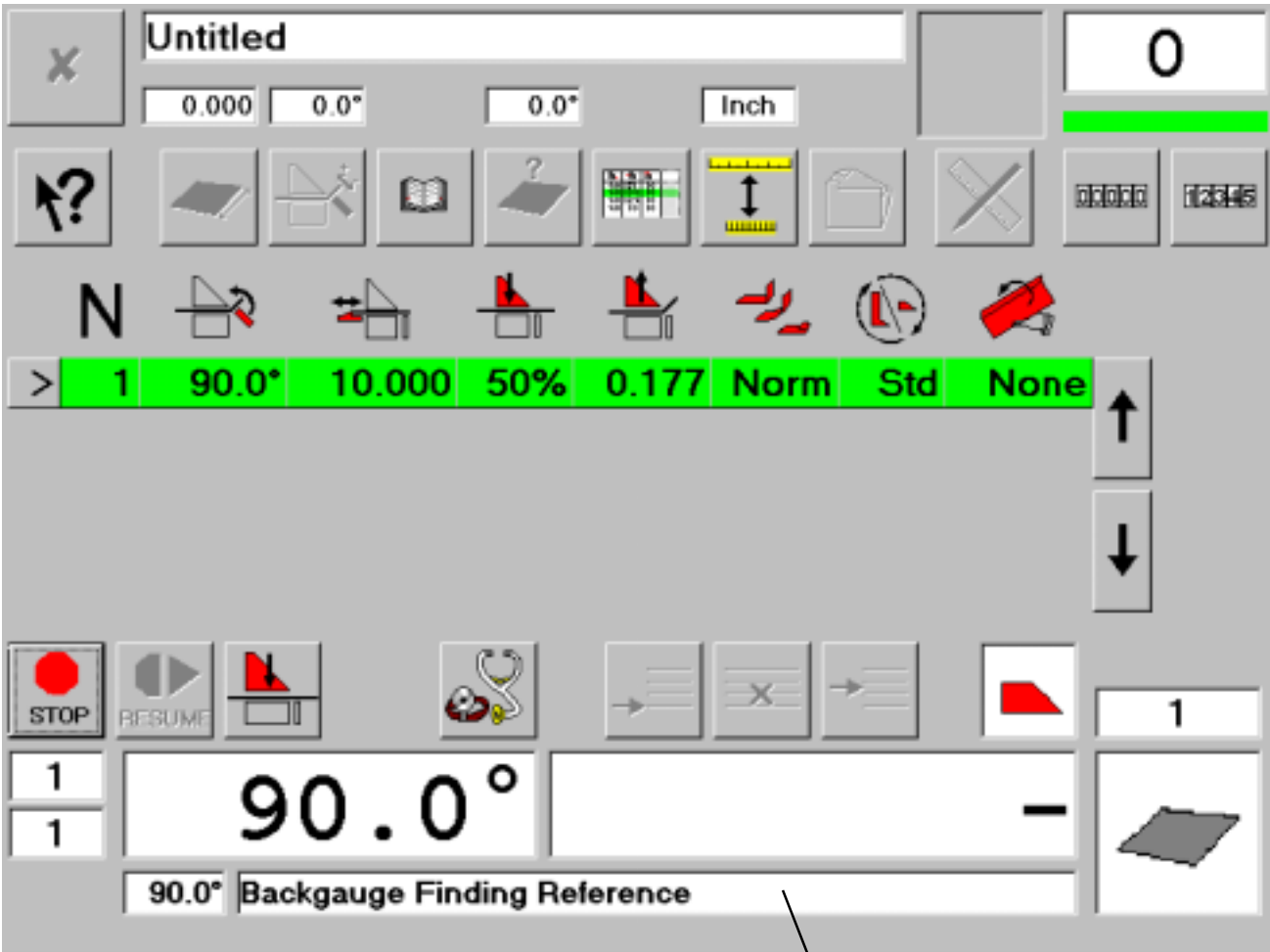
Figure 5-3: Resetting the Backgauge after an Emergency Stop

**START-UP
AFTER AN
EMERGENCY
STOP**

After an emergency stop, the Information Display will contain the message shown in the top view of Figure 5-3. The machine will not function until the Emergency Stop Switch is released and the backgauge homing position is reset. To reset the backgauge, follow the procedure below:

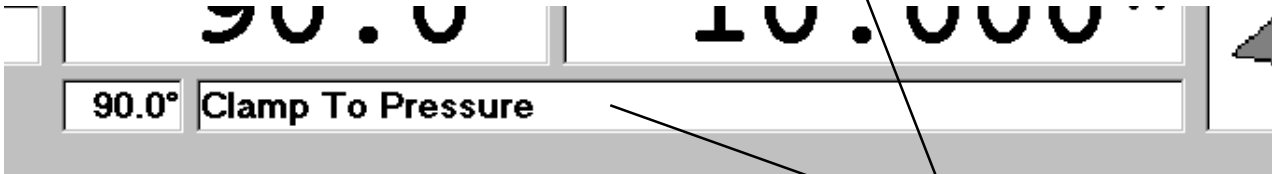
Release the Emergency Stop Switch (See Figure 5-1) by turning it until it pops out. Press the Reset Button. The Information Display will contain the message shown in the middle view of Figure 5-3.

Touch the Run Touchbutton. The Information Display will contain the message shown in the bottom view of Figure 5-3. Press the foot pedal to reset the backgauge.



During Backgauge Resetting

START4



Completing Backgauge Resetting

START5



Resetting Complete

START6

Figure 5-4: Completing the Backgauge Resetting Procedure

While the backgauge finds its home position, the Information Display will contain the message shown in the top view of Figure 5-4. When the backgauge position has been established, the Information Display will contain the message shown in the middle view of Figure 5-4.

Press the foot pedal once more. The machine will now clamp to pressure. The machine is ready for operation.

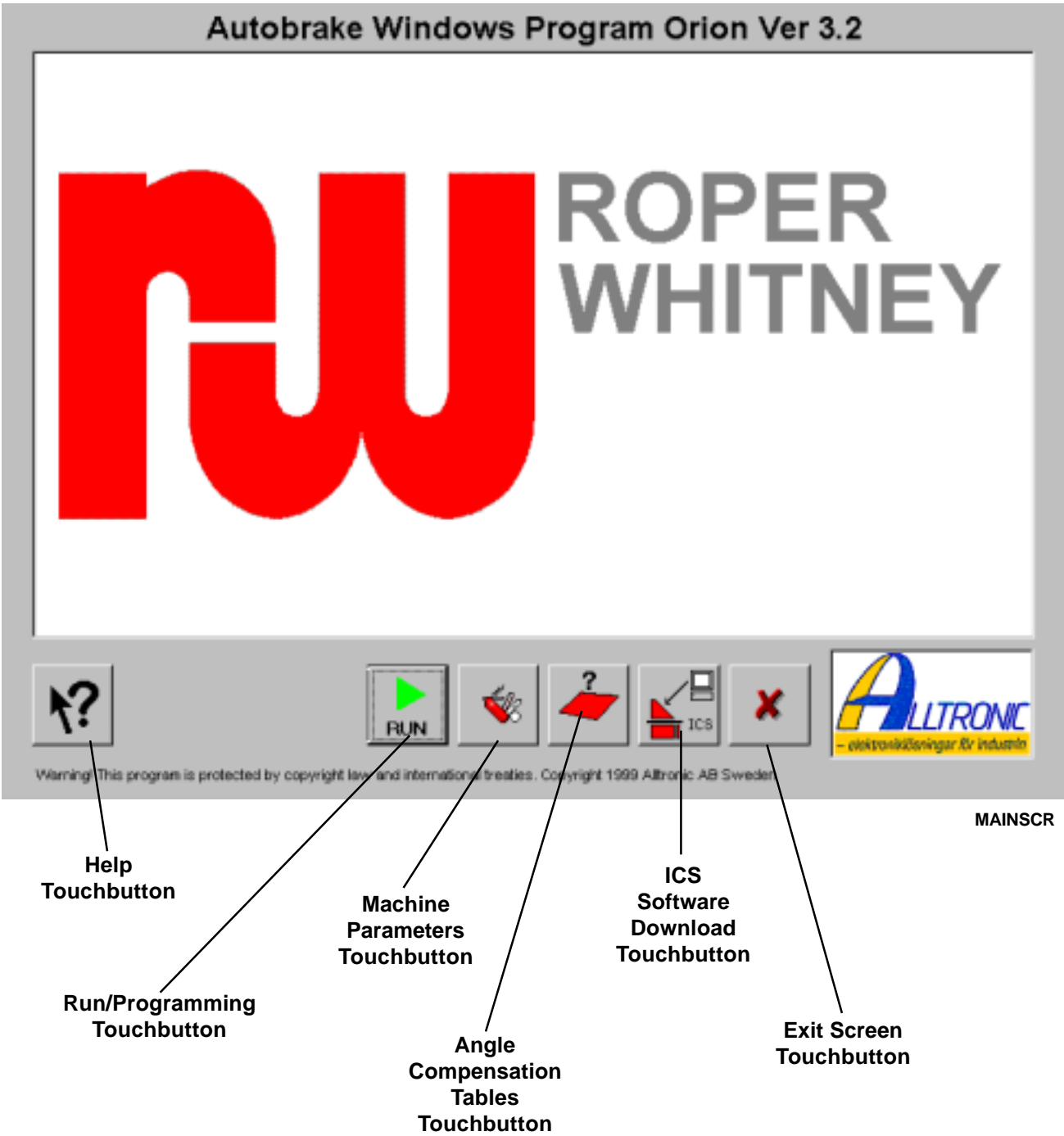


Figure 6-1. Orion Control System Mainscreen

SECTION 6

MAIN SCREEN

After the machine power and computer power have been turned on, the WINDOWS operating system loads, and then the Main Screen, shown in Figure 6-1, appears on the computer display. All control system functions are initiated from this screen, either directly, or through additional screens.

The touchbuttons (the screen areas depicted graphically as buttons) are activated by touching them with a finger. An explanation of the Main Screen Touchbuttons is given below.

HELP TOUCHBUTTON

The Help Touchbutton is used to provide an explanation of the various touchbuttons on the screen. When the Help button is pressed a question mark appears after the cursor arrow. Press the touchbutton for which an explanation is desired. A box explaining the function of the touchbutton will appear.

To get an explanation for another touchbutton, repeat the process. The Help Touchbutton must be touched each time an explanation is needed.

The Help Touchbutton appears on many of the control system screens. It does not always appear in the same place on the other screens. It functions the same way on all screens.

RUN/ PROGRAMMING TOUCHBUTTON

When the Run/Programming Touchbutton is pressed the Main screen is replaced by the Operation and Programming Screen. All machine operation and programming is controlled from the Run/ Programming Screen. See Figure 6-1.

MACHINE PARAMETERS TOUCHBUTTON

When the Machine Parameters Touchbutton is pressed the Main Screen is replaced by the Machine Parameters Screen. See Section 13.

ANGLE COMPENSATION TABLES TOUCHBUTTON

When the Angle Compensation Tables Touchbutton is pressed the Main Screen is replaced by the Compensation Table Screen. See Section 8, Operation.

ICS SOFTWARE DOWNLOAD TOUCHBUTTON

The ICS Software Download Touchbutton is used only by technicians when upgrading the ICS. Instructions for upgrading are contained in Appendix C.

EXIT SCREEN TOUCHBUTTON

When the Exit Screen Touchbutton is pressed ,the Main Screen is closed. See Section 9 for a complete description of the machine shutdown procedure.

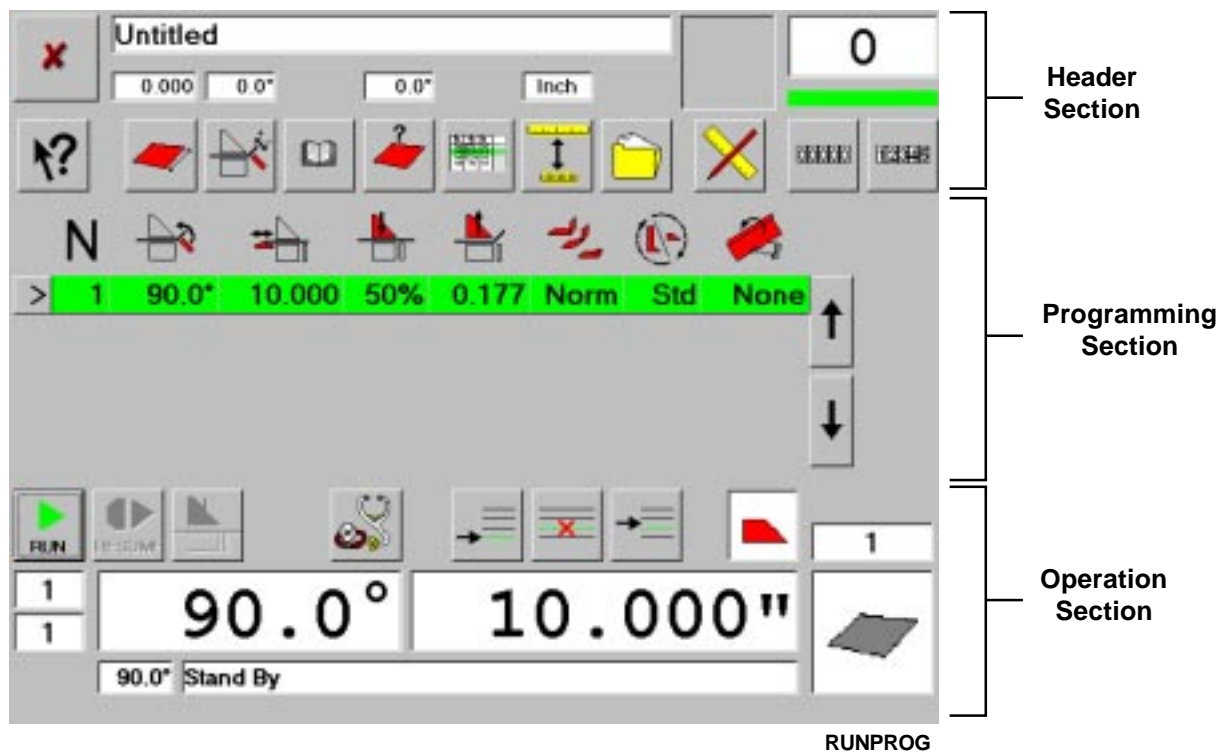


Figure 7-1. The Three Basic Sections of the Run/Programming Screen

SECTION 7.

RUN/PROGRAMMING SCREEN

The machine is operated from the Run/Programming Screen. This is also the screen which is used for programming purposes, so many of the information displays and touchbuttons are functional when programming as well as when operating the machine.

For the purpose of explaining the screen, it can be divided into the three sections described below.

HEADER SECTION

The Header Section of the Run/Programming Screen contains four types of information and control features. System access functions are available from the Run/Programming Screen. Certain overall machine functions are controlled from this portion of the screen. This portion of the screen also controls the appearance of the programming section, and acts as a parts counter during machine operation.

PROGRAMMING SECTION

The Programming Section of the screen provides an area for creating programs when graphic programming is not used. In addition, it provides program information for existing programs during machine operation. Because existing programs can be modified prior to running, it also functions as an area where such modifications can be made. Complete programming information is provided in Sections 10, Manual Programming, and Section 11, Graphic Programming.

OPERATION SECTION

The Operation Section of the screen provides detailed information required by the operator during machine operation. Complete information on machine operation is provided in Section 8, Operation.

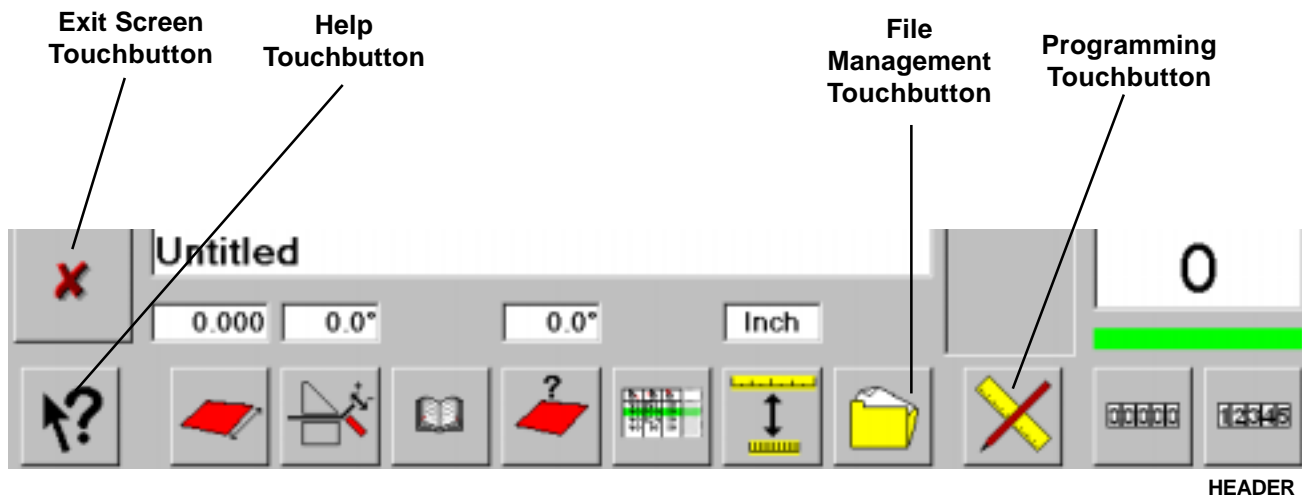


Figure 7-2.; The Header Section of the Run/Programming Screen and System Access Touchbuttons

**SYSTEM
FUNCTIONS**

Touchbuttons for System Functions are contained in the Header Portion of the Run/Programming Screen. These are identified in Figure 7-2.

**HELP
TOUCHBUTTON**

The Help Touchbutton is used to provide an explanation of the various touchbuttons on the screen. A complete explanation of use of this touchbutton is included with Figure 6-1 in Section 6, Main Screen.

**FILE
MANAGEMENT
TOUCHBUTTON**

Pressing the File Management Touchbutton opens a pop-up window for managing part programs. Through file management, directories can be created or deleted, and existing programs can be opened, or deleted. Section 12, File Management ,provides a complete explanation of these activities.

**PROGRAMMING
TOUCHBUTTON**

Pressing the Programming Touchbutton puts the system in the programming mode. A complete explanation of programming procedures is given in Section 10, Manual Programming, and Section 11, Graphic Programming.

**EXIT SCREEN
TOUCHBUTTON**

The Exit Screen Touchbutton closes the Programming and Operations screen when pressed, and returns the operator to the Main screen.

If the Run/Programming Screen contains program information from a run operation or a programming operation, the operator must make a decision to save the screen information or discard it before he is returned to the Main Screen. Complete details are given in Section 8, Operation, Section 10, Manual Programming, and Section 11, Graphic Programming.

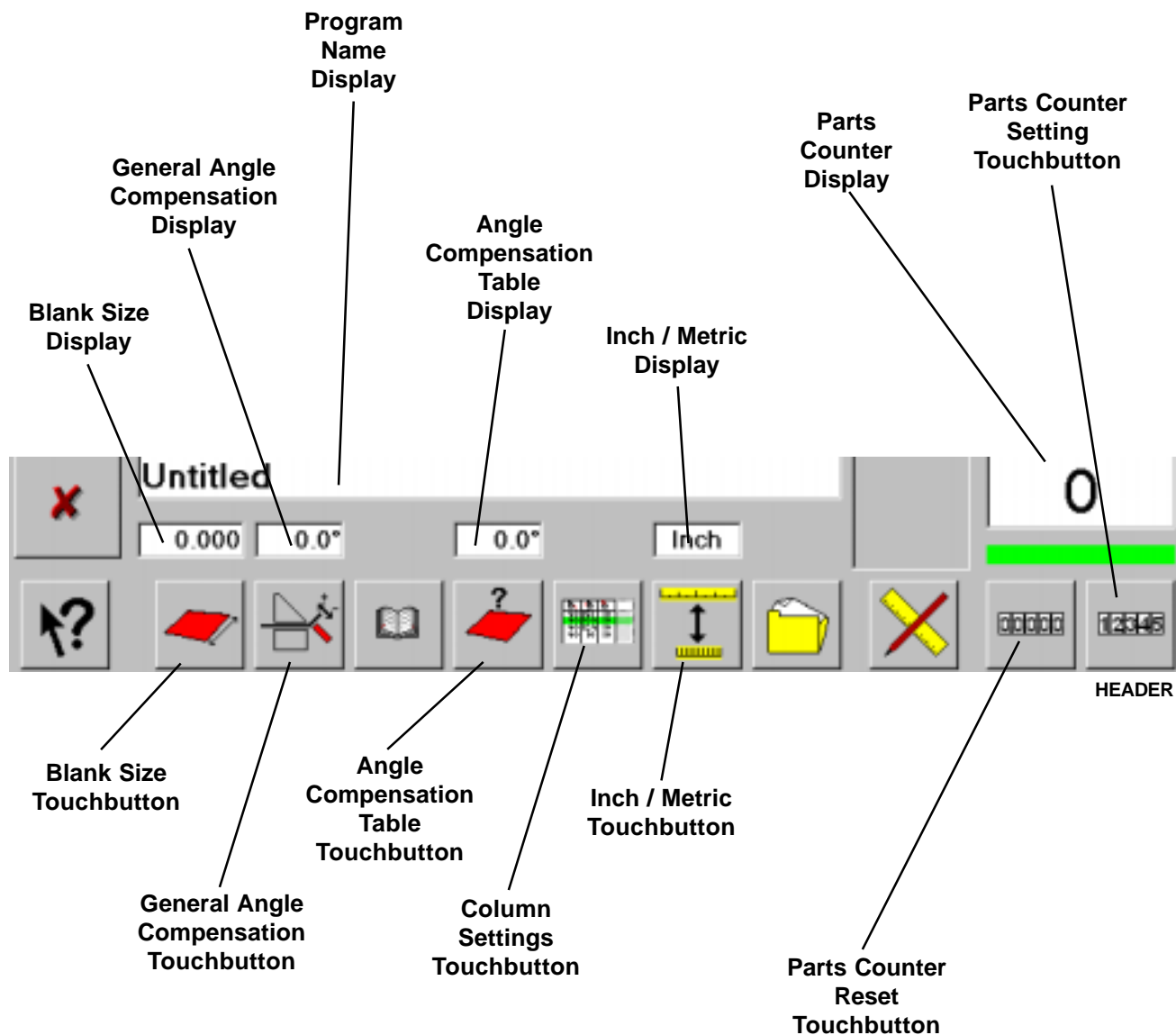


Figure 7-3. The Header Section of the Run/Programming Screen Showing General performance Touchbuttons

**GENERAL
MACHINE
FUNCTION
TOUCHBUTTONS**

The General Machine Performance Touchbuttons control certain areas of machine performance. These areas pertain to overall performance, regardless of the operation being performed. Some of them are calculated by the system, and others can be overridden for individual operations by special programming.

**PROGRAM
NAME DISPLAY**

The Program Name Display shows the name of the program being run, or modified. If the program is being prepared, the word "Untitled" appears in this display until the program is assigned a name and saved.

**BLANK SIZE
DISPLAY**

The Blank Size Display shows the blank size used for the part being produced by the program being run. This value may be an entered value, or it may be a calculated value produced when the program was produced by the graphic programming method.

**BLANK SIZE
TOUCHBUTTON**

The Blank Size Touchbutton allows entry of the blank size if none exists. See Figure 10-8 in Section 10, Manual Programming, for an explanation of the method used to enter a blank size.

**GENERAL
ANGLE
COMPENSATION
DISPLAY**

The General Angle Compensation Display shows the amount of general angle compensation applied to machine operation. Compensation can be either a positive or a negative value. The compensation pertains to all bending operations for the program being performed.

**GENERAL
ANGLE
COMPENSATION
TOUCHBUTTON**

The General Angle Compensation Touchbutton allows entry of general angle compensation. See Figure 10-8 in Section 10, Manual Programming, for an explanation of the method used to enter general angle compensation.

**INCH / METRIC
DISPLAY**

The Inch/Metric Display shows which units of measure are being used by the machine for the operation at hand.

**INCH/METRIC
TOUCHBUTTON**

The Inch/Metric button toggles the Inch/Metric Display between inches and millimeters. Internally, the entire memory is converted to display all length measurements in the chosen form: backgauge position, blank size, and hem offsets. The part program is not affected in any way.

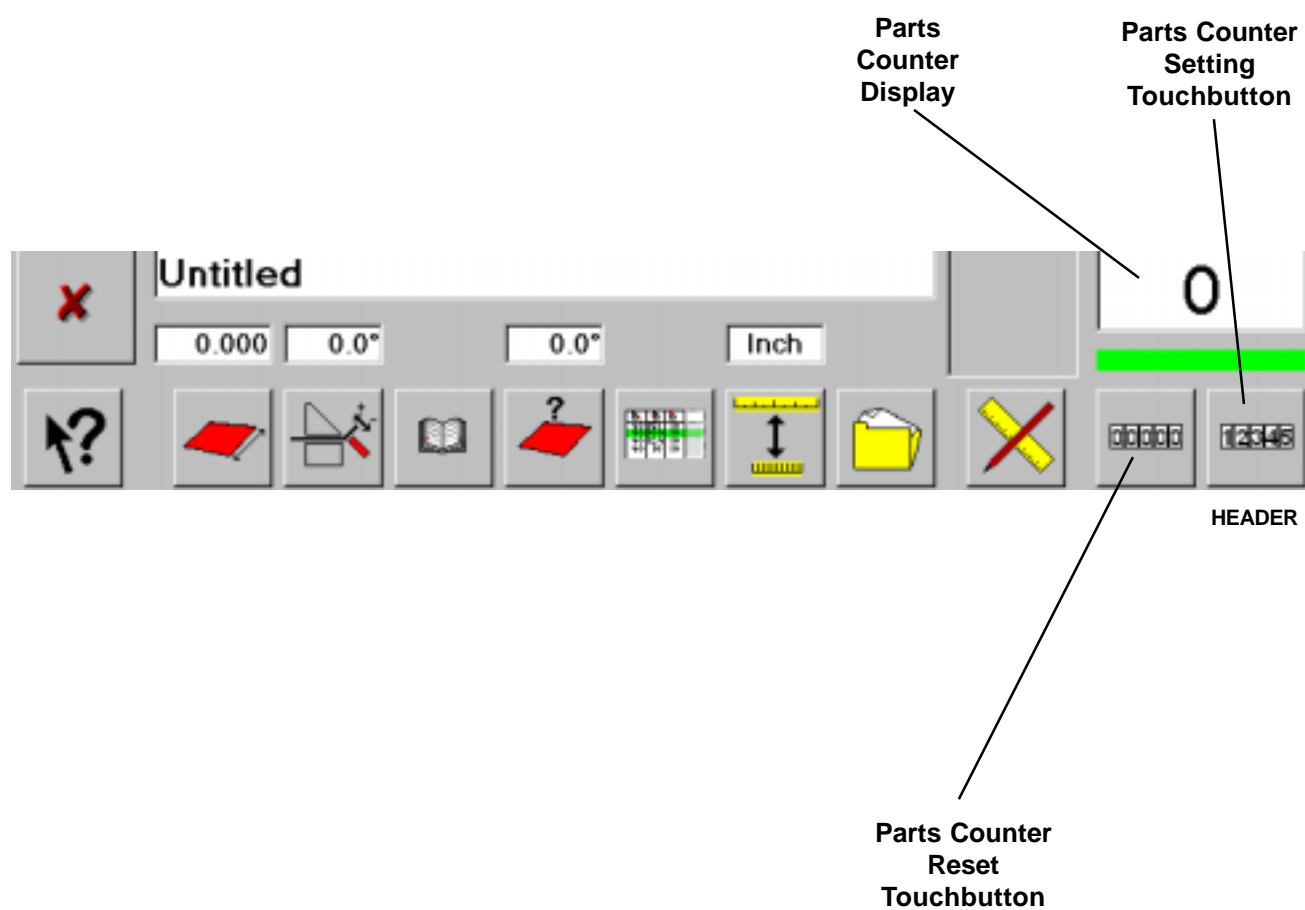


Figure 7-4. The Header Section of the Run/Programming Screen Showing Parts Counter Touchbuttons

**HEADER
OPERATION
COMPONENTS**

The Header Section of the Run/Programming Screen contains part counting and count setting components. These items function only when the machine is running a bending program.

**PARTS
COUNTER
DISPLAY**

The Parts Counter Display shows the number of parts being run. It displays the number in one of two ways. If the Setting Touchbutton was used to set the number of parts wanted, the Display counts backward from the total wanted to "Zero". When "Zero" is reached, the part program has been completed. If the Reset Touchbutton was used, the machine is set to "Zero", and the machine counts upward as parts are run.

**PARTS
COUNTDOWN
SETTING
TOUCHBUTTON**

The Parts Counter Setting Touchbutton sets the number of parts to be run. See Section 8 and Figure 8-4.

**PARTS
COUNTER
RESET
TOUCHBUTTON**

The Parts Counter Reset Touchbutton resets the Parts Counter Display to Zero.

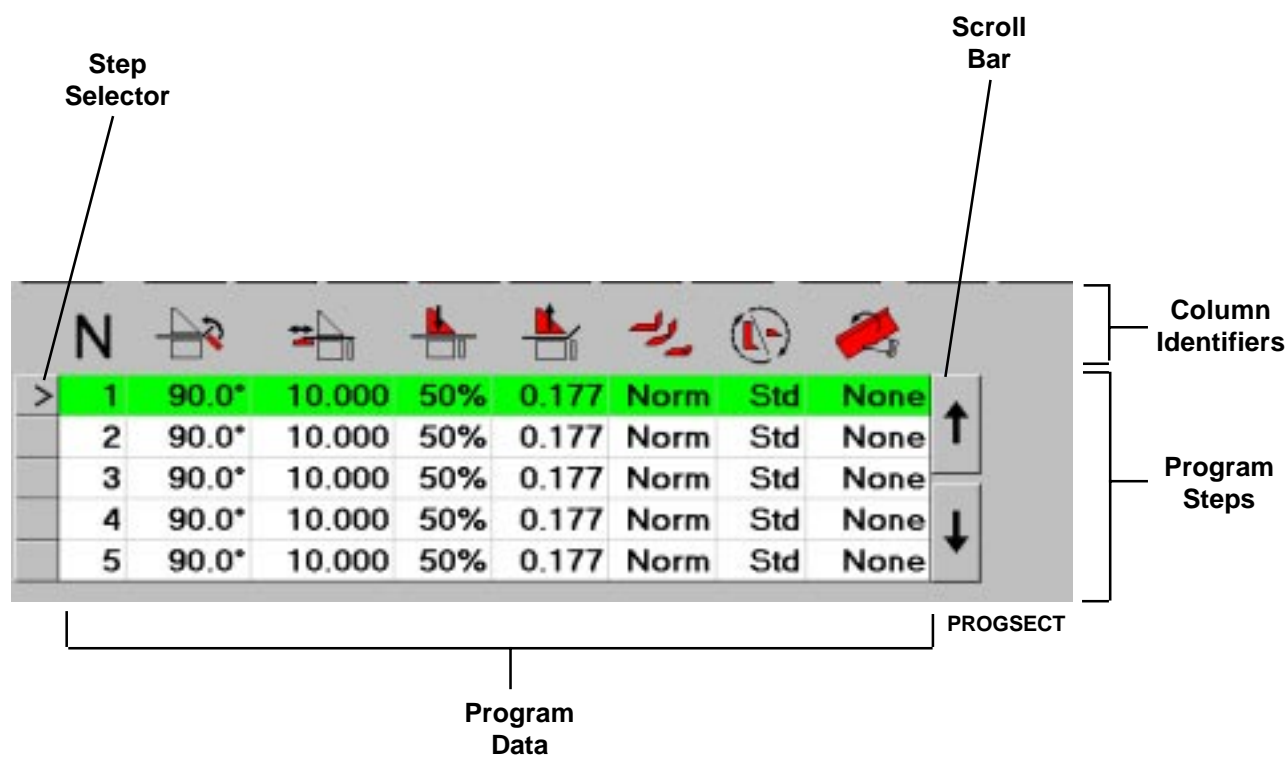


Figure 7-5. The Part Program Section of the Run/Programming Screen

**PART
PROGRAM
SECTION**

The Part Program Section of the Run/Programming Screen is shown in Figure 7-5. It contains the programmed information for forming the work material. It is the portion of the screen used to create new programs. Complete Programming procedures are provided in Section 10, Manual Programming, and Section 11, Graphic Programming.

It is also the portion of the screen which contains program data during operation, where operator interaction is necessary. Complete instructions are provided in Section 8, Operation.

Because existing programs can be modified before they are run, this portion of the screen also provides a location for modifying program data. Modification instructions are also provided in Section 8, Operation.

**PROGRAM
DATA**

Program Data is provided in table format in the Program Data portion of the screen. Data for each step, or operation, is contained in a horizontal row across the program data area.

**PROGRAM
STEPS**

Each step is listed in order, starting with Step 1. The information is arranged in a series of columns, starting with the operation number.

**COLUMN
IDENTIFIERS**

The Column Identifiers are presented in a row across the top of the Program Data area. Because there are more columns available than the screen can hold, some columns can be removed from the screen. An explanation of these identifiers is provided with Figure 6-6.

SCROLL BAR

The arrows located to the right of the display scroll up or down through the program, one operation at a time.

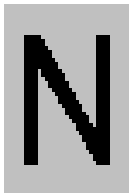
**STEP
SELECTOR**

Any of the operations currently shown on the screen can be accessed directly by pressing the Step Selector immediately to the left of the operation: the selected operation is always highlighted in green.

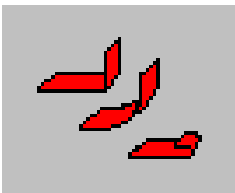
Needed for Each
Operation
Always Visible on
Screen

Needed for Each
Operation
May Be hidden

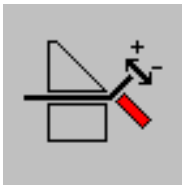
Special Values
Not Required
Usually hidden



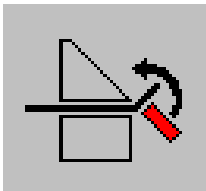
Operation
Number



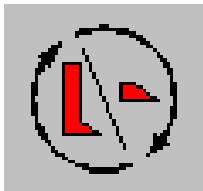
Bend Type



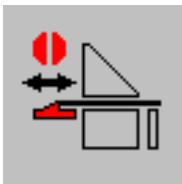
Angle
Compensation



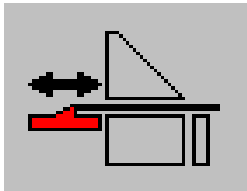
Bend Angle



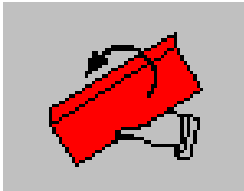
Tooling Position



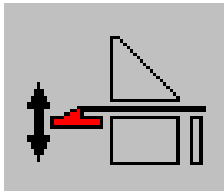
Backgauge
Pause



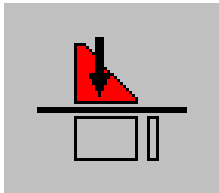
Backgauge
Position



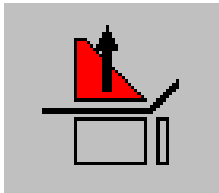
Material Handling



Backgauge
Height Position



Clamping
Pressure



Open Height

ARTNOS		
ENN	BENDTYPE	ANGCOMP
BENDANG	TOOLPOS	BACKPSE
BACKGAGE	MATLHAND	BACKHT
CLAMPPSI		
OPENHT		

Figure 7-6. Column Symbols

**COLUMN
SYMBOLS**

The Column Identifiers which appear in a row across the top of the Program Data area are shown in Figure 7-6. They are presented as symbols to avoid the need for translation into languages other than English.

Because there are more columns available than the screen can hold, some columns and their Identifiers are usually hidden. Procedures for hiding columns are given in both Section 8, Operation, and Sections 10, Manual Programming; and Section 11, Graphic Programming.

Five of the column Identifiers cannot be hidden, and the columns always appear on the screen. Three of the the Identifiers can be hidden, but the information contained in the columns is required for operation. Hiding a column does not remove that data from the program. Three Identifiers are usually hidden; they identify columns whose data is not required, or is required only for certain specially equipped machines.

**OPERATION
NUMBER**

The Operation Number column identifies each operation of the part program in the order the part is to be formed.

BEND ANGLE

The Bend Angle column lists the programmed bend angle for each operation.

**BACKGAUGE
POSITION**

The Backgauge Position column lists the programmed location of the backgauge stop as measured from the nose of the upper tooling.

**CLAMPING
PRESSURE**

The Clamping Pressure column lists the clamp pressure the upper tooling places against the work material. The pressure is expressed as a percentage of the maximum available, and applies to the current operation only. Therefore, each operation may have a different clamping pressure if desired.

OPEN HEIGHT

The Open Height column lists the distance the upper beam will move upward after the current operation is complete.

The upper jaw will also move to this height prior to flattening a hem. If the Open Height in the first operation is greater than the upper jaw's starting position, the upper jaw will open until it reaches the designated position.


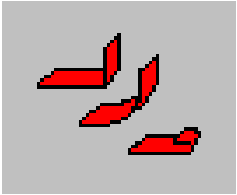
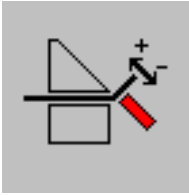
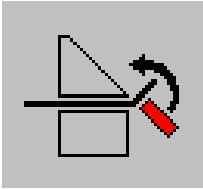
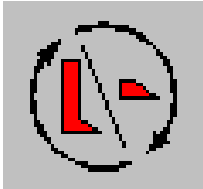
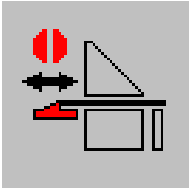
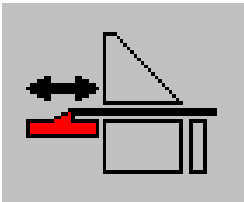
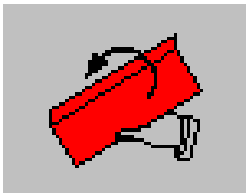
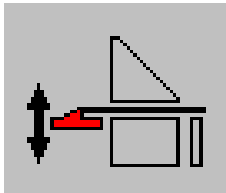
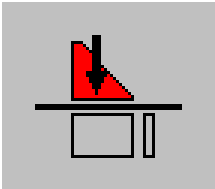
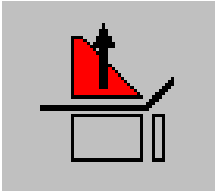
Needed for Each Operation Always Visible on Screen	Needed for Each Operation May Be hidden	Used With Special Equipment Usually hidden																		
 <p>Operation Number</p>	 <p>Bend Type</p>	 <p>Angle Compensation</p>																		
 <p>Bend Angle</p>	 <p>Tooling Position</p>	 <p>Backgauge Pause</p>																		
 <p>Backgauge Position</p>	 <p>Material Handling</p>	 <p>Backgauge Height Position</p>																		
 <p>Clamping Pressure</p>																				
 <p>Open Height</p>																				
<table border="1"> <thead> <tr> <th colspan="3">ARTNOS</th></tr> </thead> <tbody> <tr> <td>ENN</td><td>BENDTYPE</td><td>ANGCOMP</td></tr> <tr> <td>BENDANG</td><td>TOOLPOS</td><td>BACKPSE</td></tr> <tr> <td>BACKGAGE</td><td>MATLHAND</td><td>BACKHT</td></tr> <tr> <td>CLAMPPSI</td><td></td><td></td></tr> <tr> <td>OPENHT</td><td></td><td></td></tr> </tbody> </table>			ARTNOS			ENN	BENDTYPE	ANGCOMP	BENDANG	TOOLPOS	BACKPSE	BACKGAGE	MATLHAND	BACKHT	CLAMPPSI			OPENHT		
ARTNOS																				
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BENDANG	TOOLPOS	BACKPSE																		
BACKGAGE	MATLHAND	BACKHT																		
CLAMPPSI																				
OPENHT																				

Figure 7-6. Column Identifiers (continued)

BEND TYPE	The Bend Type column lists the type of bend programmed. Complete information on bend types is given in both Section 8, Operation, Section 10, Manual Programming, and Section 11, Graphic Programming.
TOOLING POSITION	The Tooling Position column lists the type of tooling to be used in the current operation: the choices are Standard or Box. This feature is only functional on machines equipped with the Kombi rotating upper beam. Complete information on tooling positions is given in Section 8, Operation, Section 10, Manual Programming, and Section 11, Graphic Programming.
MATERIAL HANDLING	The Material Handling column provides handling instructions to be used by the operator for the current operation. The type of handling is “abbreviated” in the column; it is also graphically represented in the lower right-hand corner of the Run/Programming Screen. Complete information on material handling is given in Section 8, Operation, Section 10, Manual Programming, and Section 11, Graphic Programming.
ANGLE COMPENSATION	The Angle Compensation column lists an angle compensation value for the current operation only. This compensation is in addition to any general angle compensation and any included from angle correction tables. Angle compensation can be a positive or a negative number. (Negative numbers actually reduce the overall compensation applied to the bend.)
BACKGAUGE PAUSE	The Backgauge Pause column provides a means to halt the motion of the backgauge and lower the backgauge fingers during any operation. If the Backgauge Pause is set to “Yes”, then the backgauge will not move to the programmed position of the current operation until either the clamp or the unclamp foot pedal is pressed. This gives the operator time to position or rotate the work material on the backgauge table without scratching it on the backgauge fingers. Complete information on the backgauge pause feature is given in Section 8, Operation, Section 10, Manual Programming, and Section 11, Graphic Programming.
BACKGAUGE HEIGHT POSITION	The Backgauge Height Position column lists the programmed vertical position of the backgauge table on those machines equipped with this feature.

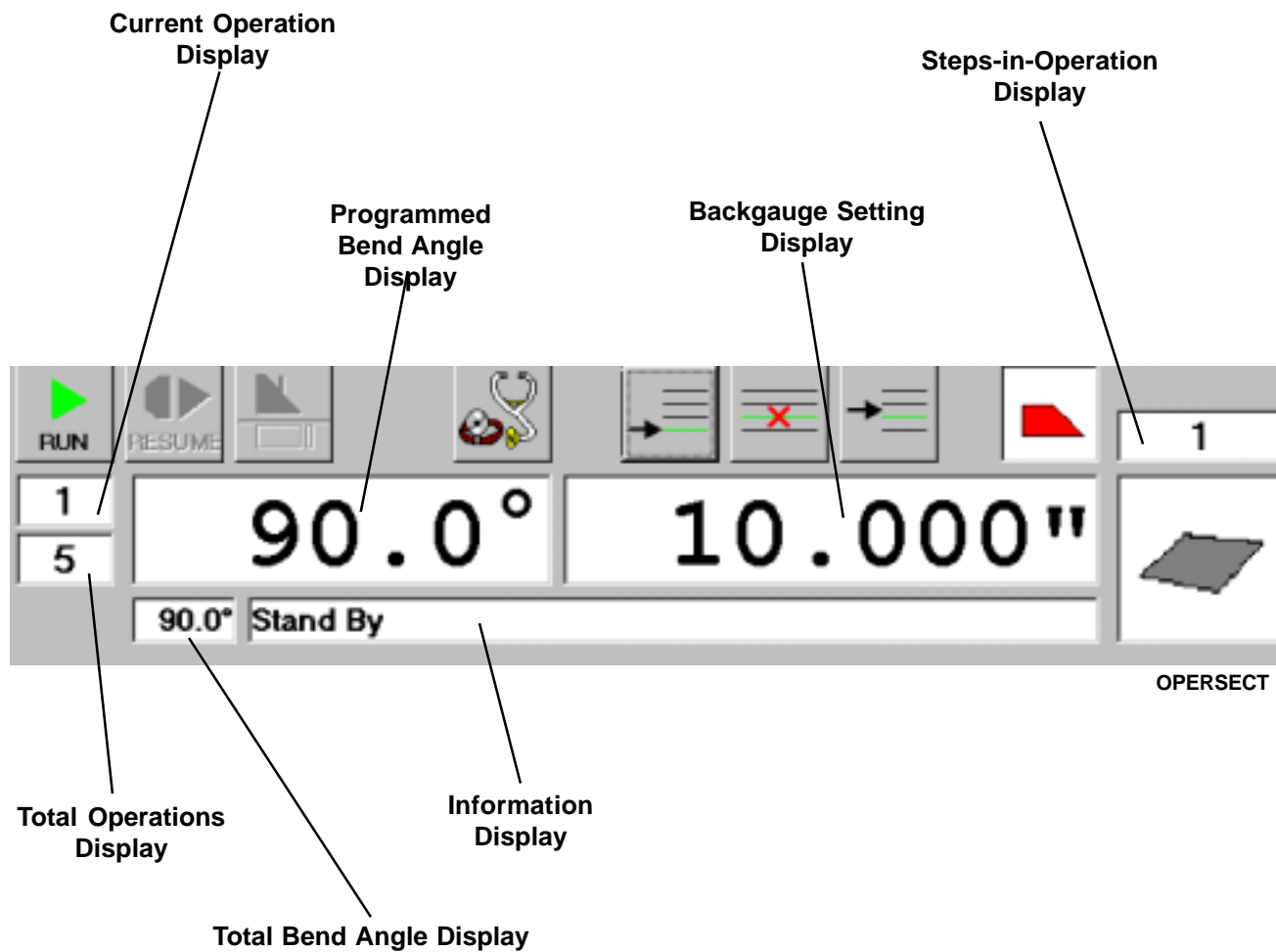


Figure 7-7. Current Operation Section of the Run/Programming Screen

CURRENT OPERATION SECTION	The Current Operation section of the Run/Programming Screen is the portion of the screen used to run existing programs. It contains touchbuttons which control the run cycle, and provides information on the program being run.
INFORMATION DISPLAY	The Information Display provides information regarding machine status or action required by the operator. When a portion of the machine is in motion, the message window will state what the machine is doing. If the machine requires operator action, the Information Display will prompt the operator. If there is a machine fault, the display will provide an appropriate warning. When the Emergency Stop is engaged the message will display that fact.
CURRENT OPERATION DISPLAY	The Current Operation Display provides the number of the operation being performed.
STEPS-IN-OPERATION DISPLAY	The Steps-in-Operation Display provides the current step being performed during the operation. For instance: a hemming operation will have two steps, while a radius bending operation may have many. The display counts down from the total number required to "Zero".
TOTAL OPERATIONS DISPLAY	The Total Operations Display provides the number of the final operation in the program.
PROGRAMMED BEND ANGLE DISPLAY	The Programmed Bend Angle Display provides the bend angle programmed for the operation being performed.
TOTAL BEND ANGLE DISPLAY	The Total Bend Angle Display provides the actual bend angle to which the machine will work when all the compensating factors have been taken into account. It may be more or less than the programmed bend angle.
BACKGAUGE SETTING DISPLAY	The backgauge Setting Display provides the programmed distance from the backgauge to the bend point between the machine jaws.

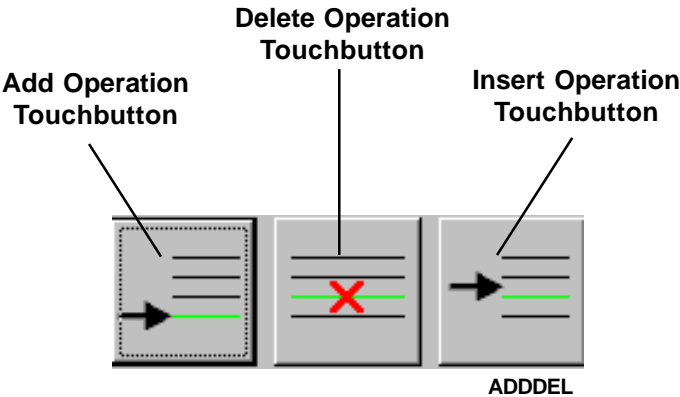


Figure 7-8. Operation Touchbuttons

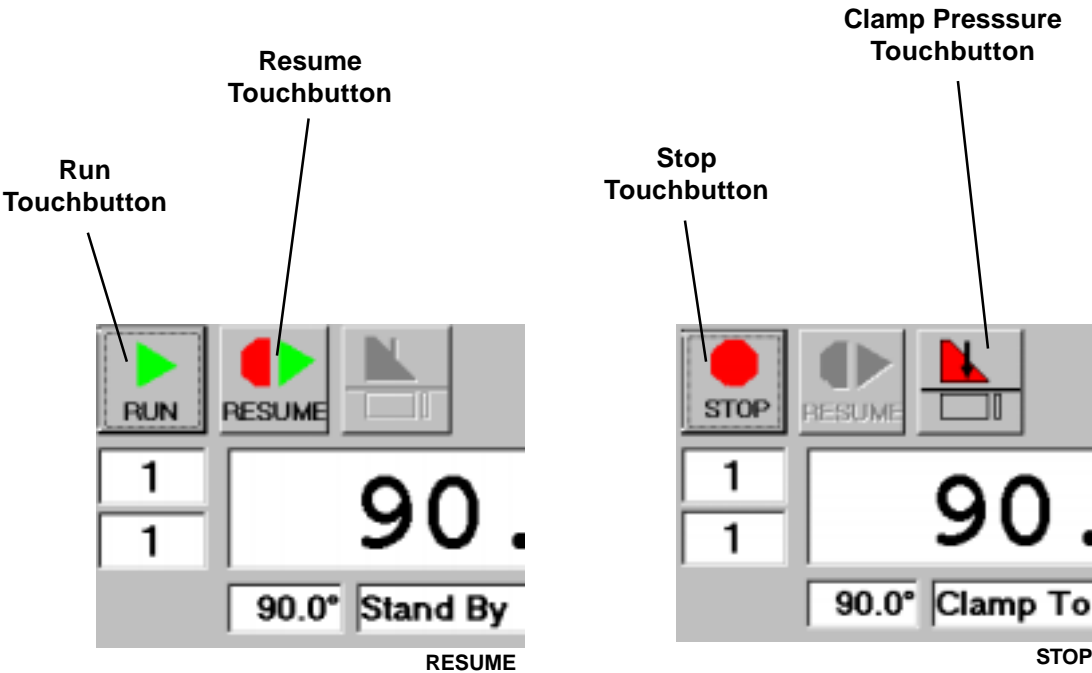
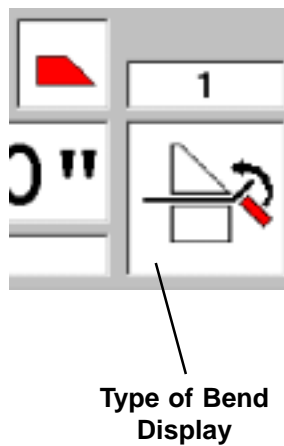
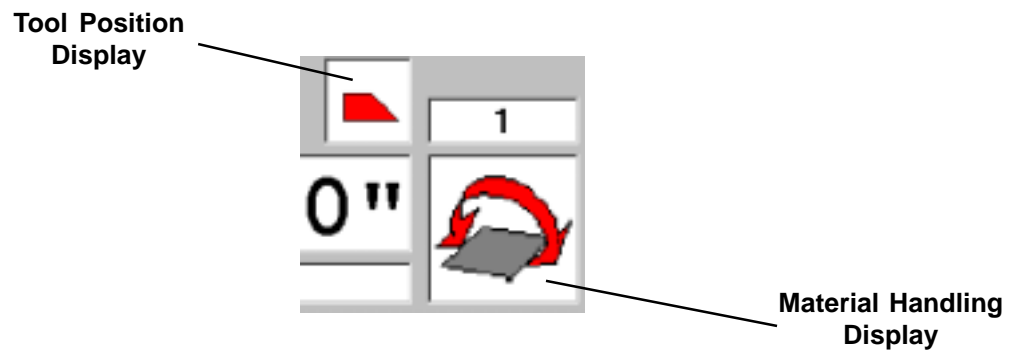


Figure 7-9. Operational Touchbuttons

OPERATION TOUCHBUTTONS	The three buttons located in the center of the Current Operation Section of the Run/Programming Screen, and shown in Figure 7-8, enables the operator to create or modify existing programs. Complete modification instructions are contained in Section 8, Operation and Section 10, Manual Programming.
ADD OPERATION TOUCHBUTTON	The Add Operation Touchbutton creates a new operation at the end of the program.
DELETE OPERATION TOUCHBUTTON	The Delete Operation Touchbutton deletes the highlighted operation within the program.
INSERT OPERATION TOUCHBUTTON	The Insert Operation Touchbutton inserts an operation before the highlighted operation, and renumbers all following operations accordingly.
OPERATIONAL TOUCHBUTTONS	The Operational Touchbuttons are shown in Figure 7-9. They control starting, stopping, and emergency unclamping of the machine.
RUN TOUCHBUTTON	The Run Touchbutton starts machine operation. Whenever it is pressed, the machine starts the bending process from the first operation of the program. When the Run Touchbutton is pressed it is also replaced by the Stop Touchbutton.
STOP TOUCHBUTTON	The Stop Touchbutton halts machine operation at the end of the current operation. When the Stop Touchbutton is pressed it is also replaced by the Run Touchbutton.
RESUME TOUCHBUTTON	The Resume Touchbutton enables the machine operator to resume a program which has been stopped before it has been completed. When pressed, it starts the bending program at the operation following the operation during which the machine was stopped.
CLAMP PRESSURE TOUCHBUTTON	<p>The Clamp Pressure Touchbutton unclamps the clamping beam after the machine has been stopped in the middle of a program.</p> <p>The upper beam portion of the Clamp Pressure Touchbutton also signals when the machine is ready to begin operation. When the upper beam symbol is green, the machine is ready to bend the work material. The Information Display will also read "Ready to Bend".</p> <p>Bending can be done when the machine is not fully clamped. The clamping beam must be within 4 mm of the bending beam to do so. When this type of bending is done, the maximum bend angle is 90°.</p>



TOOLING AND MATERIAL HANDLING DISPLAYS The Tooling and Material Handling Displays are shown in Figure 7-10.

TOOL POSITION DISPLAY The Tool Position Display shows which type of tooling is being used for the bend operation being performed. If the machine is not equipped with a Kombi Beam, this display does not change during operation.

MATERIAL HANDLING DISPLAY The Material Handling Display is active while the machine is paused between bends. It shows the operator graphically how he should reposition the part for the next bending operation.

TYPE OF BEND DISPLAY The Type of Bend Display is shown in Figure 7-11. It replaces the Material Handling Display during the bending operation, and after the Clamp Pressure Touchbutton turns green. It shows the type of bend being performed.

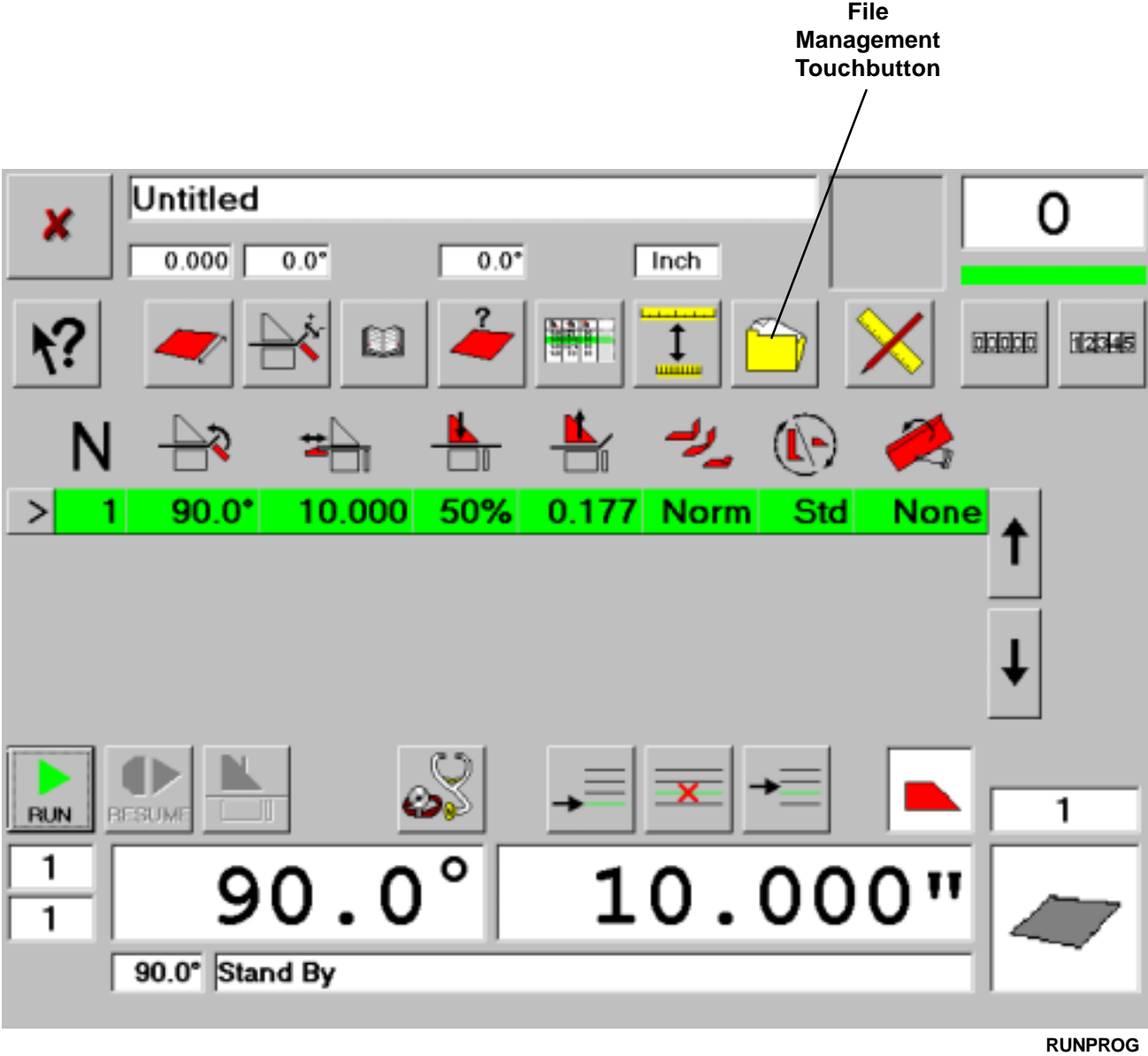


Figure 8-1. The Run/Programming Screen and Machine Operation Touchbuttons

SECTION 8 OPERATION

The machine can be operated under several different circumstances. An existing program can be called up and used as is; or the machine can also be operated under “job-shop” conditions, where existing programs are modified to produce similar parts. The machine cannot be operated without a program.

PRODUCTION OPERATION

Production operation, where an existing program can be called up and used without modification, is the normal means of operating in a production environment where the same part is run repeatedly. This section provides information on such operation.

When operated in this manner, the desired program is called up, it is started, and the machine is controlled by foot pedal operation. The only setting made before operation is to the parts counter. Production operation instructions begin with Figure 8-2.

OPERATION FROM A MODIFIED PROGRAM

When the machine is to be operated from a modified program, the program is first called up and modified, before the machine is put into operation. Modification procedures are identical to programming procedures, and are covered in Section 10, Manual Programming, and Section 11, Graphic Programming. Some programs have been developed using graphic programming procedures, and modification procedures for these programs are found in Section 11. Graphic Programming. Once modifications have been made, the machine is operated as described in this section.

GETTING STARTED

In any case, the program must first be called up. Touch the File Management Touchbutton to bring up the File Management Pop-up Screen shown in Figure 7-2.

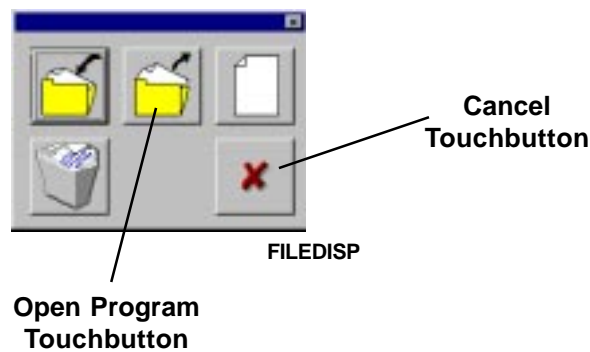


Figure 8-2. Opening a Program From the File Management Pop-Up Display

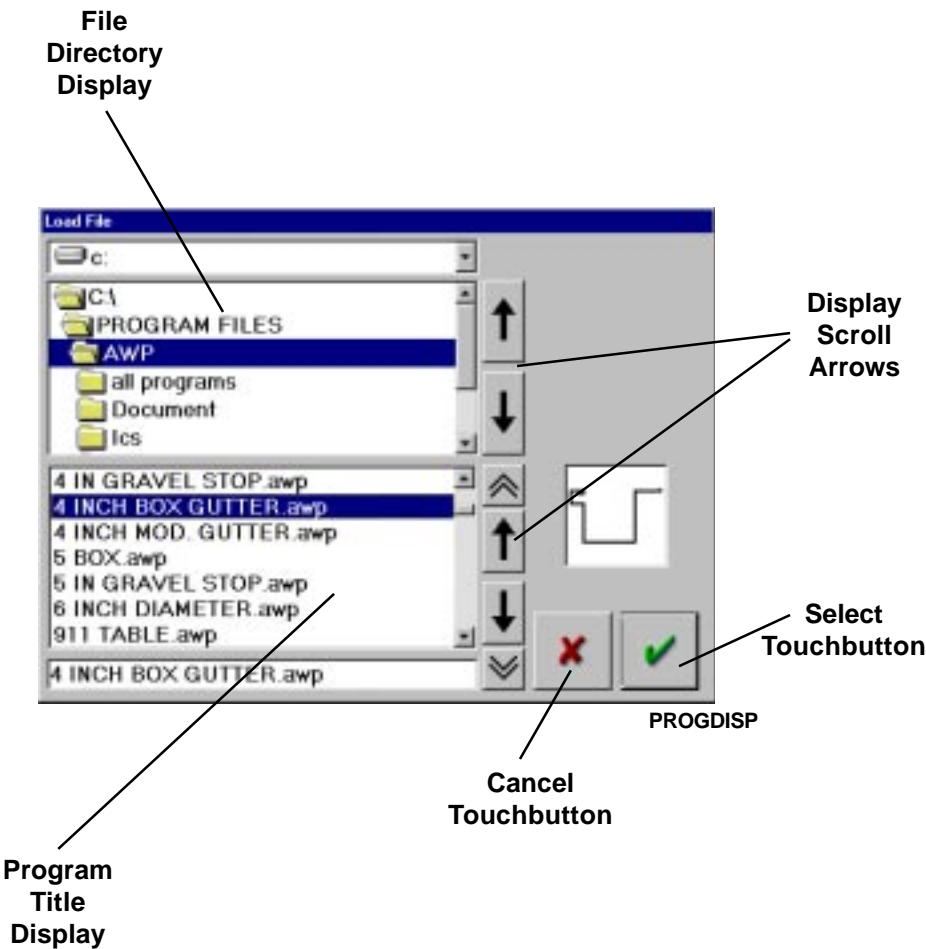


Figure 8-3. Selecting a Program From the Program Selection Display

OPENING A PROGRAM

Touch the Open Program Touchbutton to bring up the Program Selection Pop-Up Display shown in Figure 8-3. There are other touchbuttons on the File Management Pop-Up Display, but they are not used at this time. For a complete description of their use, See Section 12, File Management.

If you change your mind and do not want to call up a program, touch the Cancel Touchbutton and you will return to the Run/Programming Screen shown in Figure 8-1.

FILE DIRECTORY DISPLAY

The File Directory Display shows the file structure on the computer hard drive. This is a WINDOWS-type file structure, and functions in the same way. Space is minimal, so file names longer than 27 characters will not fit completely within the display. Use the Display Scroll Arrows to move up and down within the file structure to locate the desired directory.

When the desired directory is located, touch the screen to highlight it in blue.

PROGRAM TITLE DISPLAY

The Program Title Display shows the programs located in the highlighted directory. Use the Display Scroll Arrows to move up and down through the program names to locate the desired program.

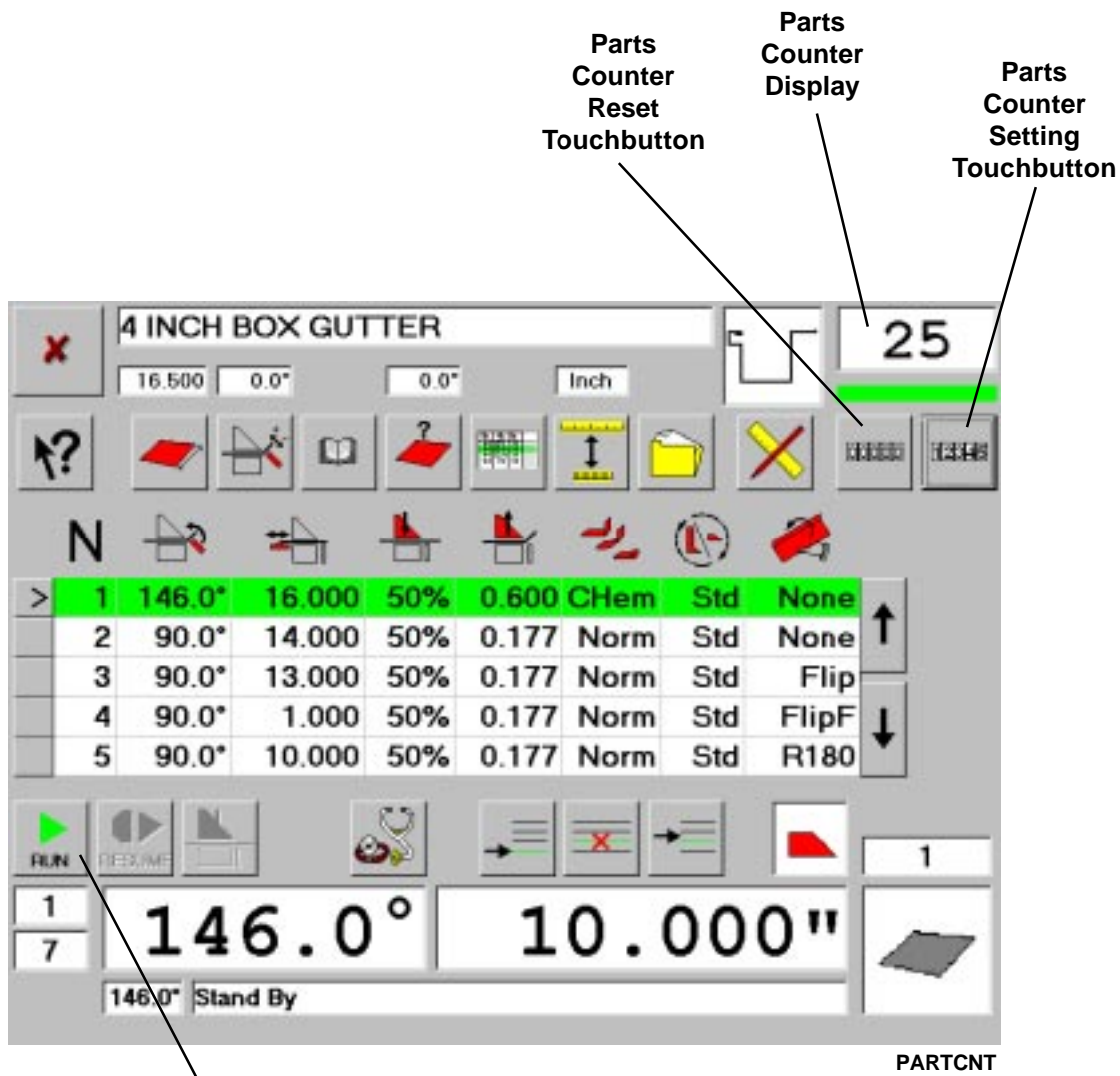
When the desired program is located, touch the screen to highlight it in blue.

SELECT TOUCHBUTTON

The Select Touchbutton calls up the program identified by the blue highlights. Touch it to load the program. The Run/Programming screen will reappear on the monitor.

CANCEL TOUCHBUTTON

If an incorrect program has been selected, touch the Cancel Touchbutton to start over.



Run
Touchbutton

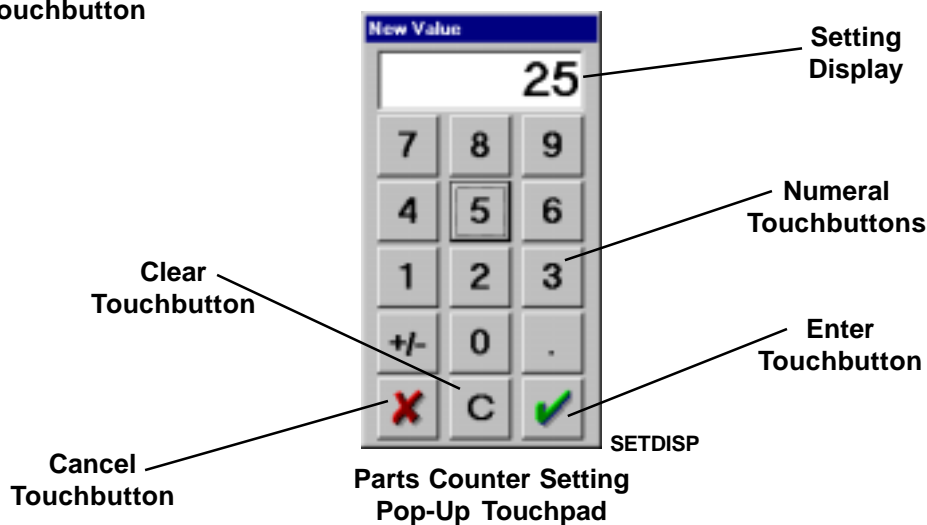


Figure 8-4. Setting the Parts Counter

**SETTING THE
PARTS
COUNTER**

Before beginning operation, the Parts Counter Display should be set.

There are two means of using the parts counter. The Parts Counter Display can be set to "0", in which case, the machine will count up from "0". Or the Parts Counter Display can be set to the total number of parts to be produced, in which case, the machine will count from that number to "0". The default is "0" when new programs are loaded.

**RESETTING TO
ZERO**

If the parts Counter Display is not at "0", touch the Parts Counter Reset Touchbutton to set it to "0".

**SETTING THE
TOTAL
NUMBER**

If the Counter is to be set to the total number of parts to be produced, touch the Parts Counter Setting Touchbutton. The Parts Counter Setting Pop-Up Touchpad will appear at the extreme right hand side of the screen. Enter the desired count using the Numeral Touchbuttons. Note that a Plus/Minus Touchbutton and a Decimal Touchbutton are included.

The count will appear in the Setting Display. If you make a mistake, touch the "C" Touchbutton to remove the last digit entered, or touch the Cancel Touchbutton to remove the entire entry.

When the Entry in the Setting Display is correct, touch the Enter Touchbutton. The number will appear in the Parts Counter Display, and the Parts Counter Setting Touchpad will disappear from the screen.

**BEGINNING
OPERATION**

After the Parts Counter Display has been set to the desired value, the machine is ready to produce parts using the selected program. Press the Run Touchbutton to begin production.

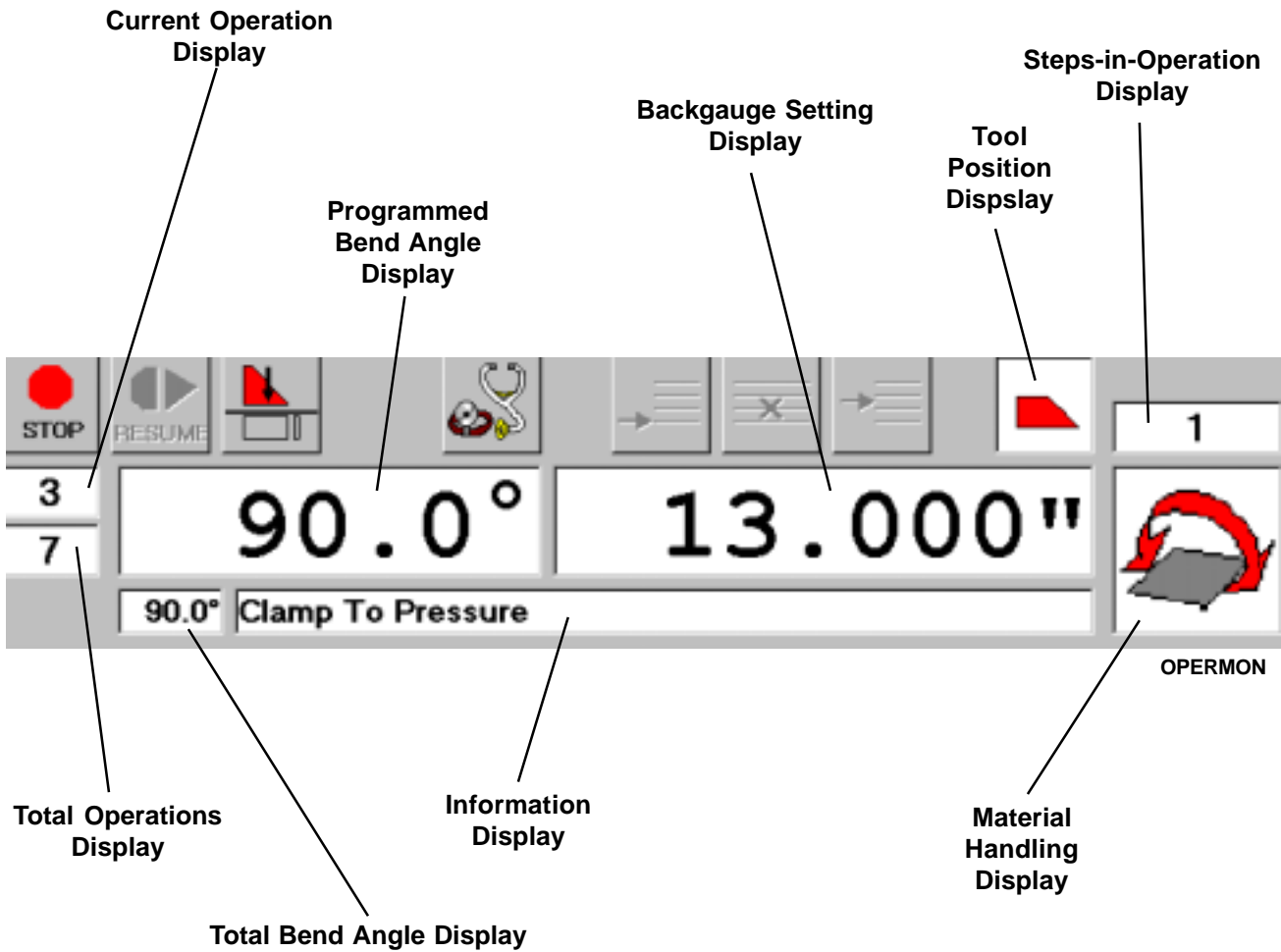


Figure 8-5. Monitoring Run/Programming Screen Displays

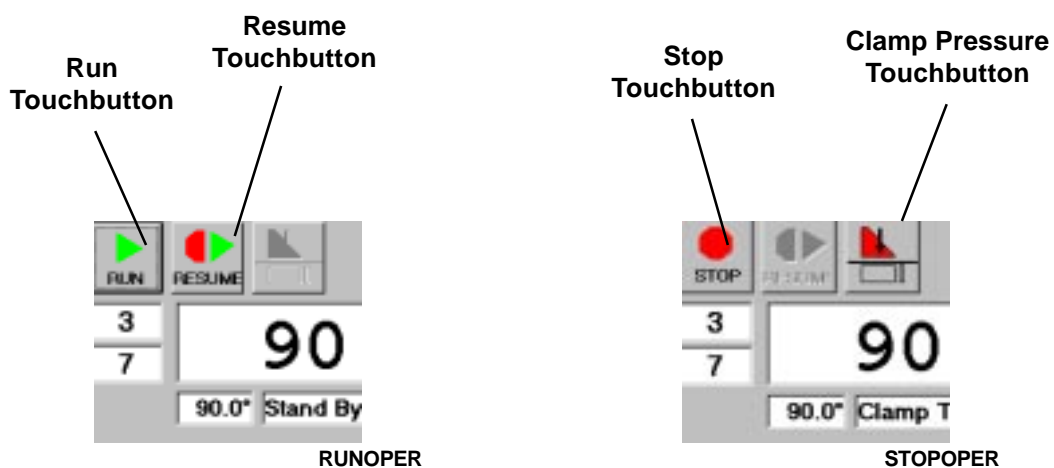


Figure 8-6. Starting and Stopping the Program

**CONTROLLING
THE BENDING
OPERATION**

The machine does not function automatically. After every bending operation, the machine operator must control certain movements of the machine and initiate each bending operation of the program by using the machine foot pedals.

The Run/Programming Screen (see Figure 8-1) is visible on the monitor during the entire program run. As each operational step in the program is performed, its line in the Programming Section of the Run/Programming Screen (see Figure 8-1) is highlighted.

**MONITORING
THE DISPLAYS**

At the same time, the displays in the Operation Section of the Run/Programming Screen provide information pertaining to the operation being performed.

Most of the displays in this portion of the screen provide data for information purposes only, but three displays must be monitored by the machine operator to enable him to interact properly with the machine.

The information display provides three kinds of information. While the machine is moving, it explains what the machine is doing. When the machine stops, it prompts the operator for the next part of the procedure he must perform. When there is a machine malfunction, the Information Display describes the malfunction.

**STARTING AND
STOPPING THE
MACHINE**

The program is started by touching the Run Touchbutton. When this happens, the symbol displayed on the Run Touchbutton changes from a triangle to an octagon (stop-sign shape), and the Run Touchbutton becomes the Stop Touchbutton.

Once running, machine operation can be halted at any point in the program by touching the Stop Touchbutton. When the Stop Touchbutton is touched, the machine completes the operation being performed, unclamps and raises the clamp beam, and ceases functioning. When this happens, the symbol displayed on the Stop Touchbutton changes from the octagon shape to the triangle shape, and the Stop Touchbutton becomes the Run Touchbutton once again.

**RESTARTING
THE MACHINE**

At this point, restarting the machine must be done properly. If the Run Touchbutton is touched, the machine starts again, but from the beginning of the program.

The Resume Touchbutton is touched, if the material is partially formed. The machine starts again from the point at which the program was halted, and the material blank in the machine will continue to be formed.

**CLAMPING
OVERRIDE
TOUCHBUTTON**

The Clamping Override Touchbutton is also a display: when it is red, the clamping beam has not applied clamping pressure; when it is green, the clamping beam is clamped and bending can proceed. At the beginning of a bend operation, the Clamping Override Touchbutton can be used to enable the machine to bend before clamping is completed. Pressing it overrides the clamping interlocks normally used by the machine. It will not work if the beam is open more than 0.4 mm (0.157 inch), and the maximum bend angle is only 90°.

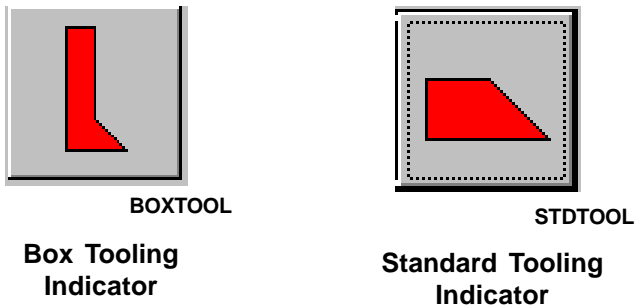
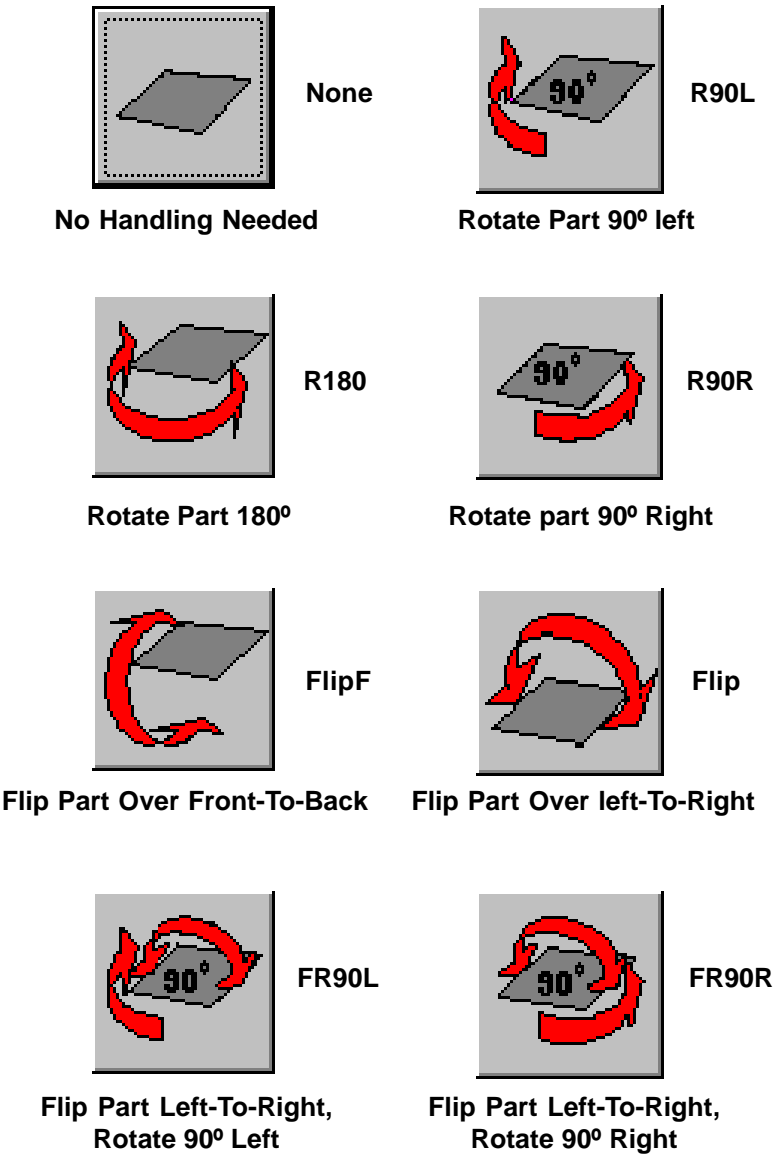


Figure 8-7. Tool Position Displays



ARTNOS	
NONE	ROT90L
ROT180	ROT90R
FLIPF	FLIP
FR90L	FR90R

Figure 8-8. Material Handling

**TOOLING
POSITIONS**

Machines equipped with Kombi beams are often programmed to switch between standard and box tooling within a program. Rotation of the Kombi beam is not automatic. The operator must therefore monitor the Tooling Display, and use the foot pedal to change the Kombi beam position when required. The tooling indicator symbols are shown in Figure 8-7. Between steps, the indicator shows the tooling needed for the next operation.

Two types of foot pedal control are available on the machine. Changing from one to the other is explained in Section 13, Machine Parameters. In one type, the Kombi beam will rotate when the foot pedal is momentarily depressed. In the other, the foot pedal must be depressed during the entire rotation cycle.

WARNING**TAKE EXTRA CARE WHEN FOOT PEDAL OPERATION
REQUIRES ONLY MOMENTARY DEPRESSION.**

Uncontrolled rotation of the Kombi beam can cause serious injury.

When prompted, depress the foot pedal in the appropriate manner to rotate the Kombi beam.

**MATERIAL
HANDLING**

It is usually necessary to reposition the part blank between steps during the forming process. The Material Handling Display indicates the material handling movement needed to ready the part for the next step in the part program. The symbols used to show the various material handling movements are illustrated in Figure 7-8. Notations below each symbol describe the action needed. "Abbreviations" for these actions are shown at the right of each symbol. These abbreviations appear in the Material Handling Column of the Programming Section of the Run/Programming Screen.

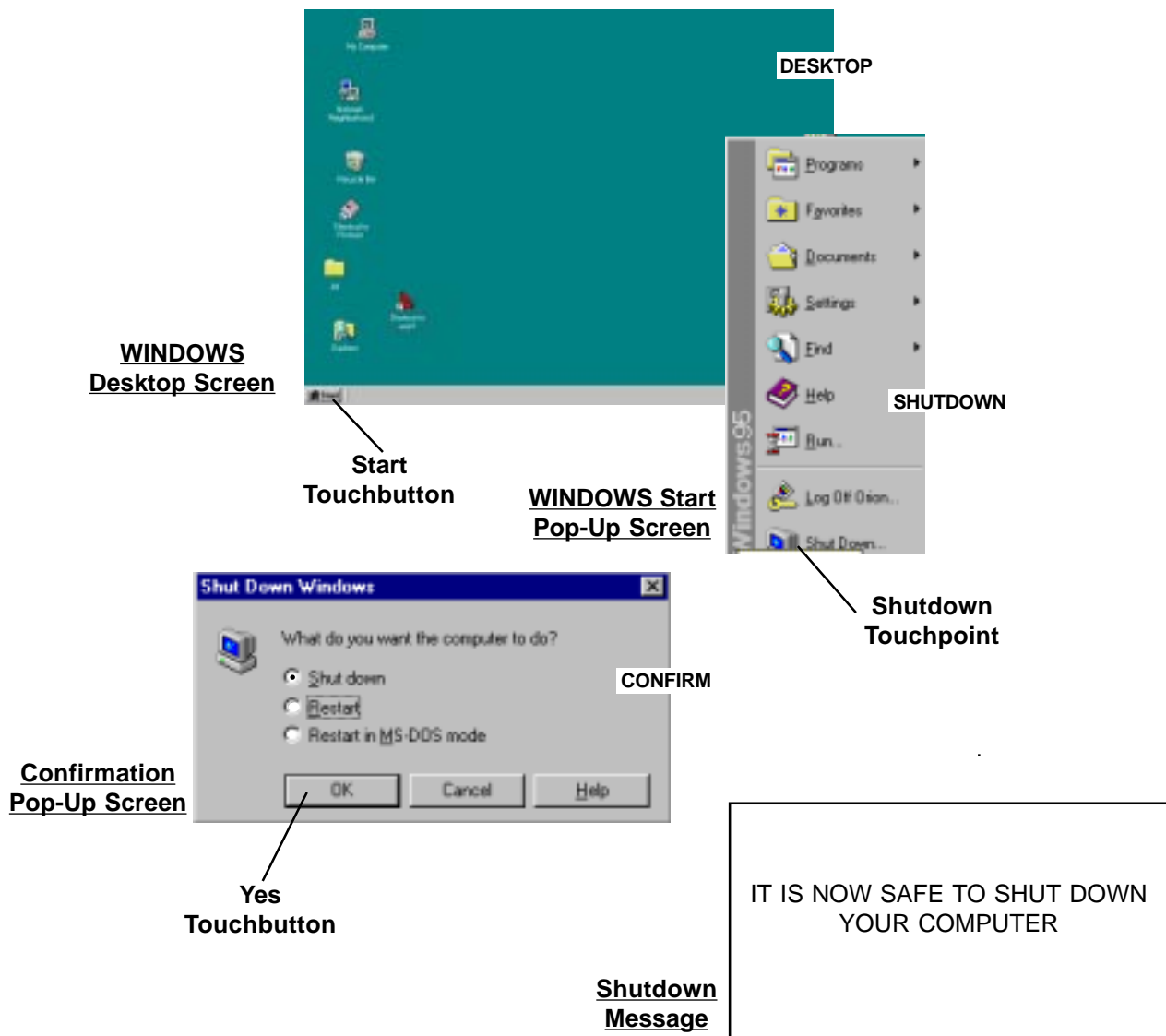


Figure 9-1. WINDOWS Shutdown Screens

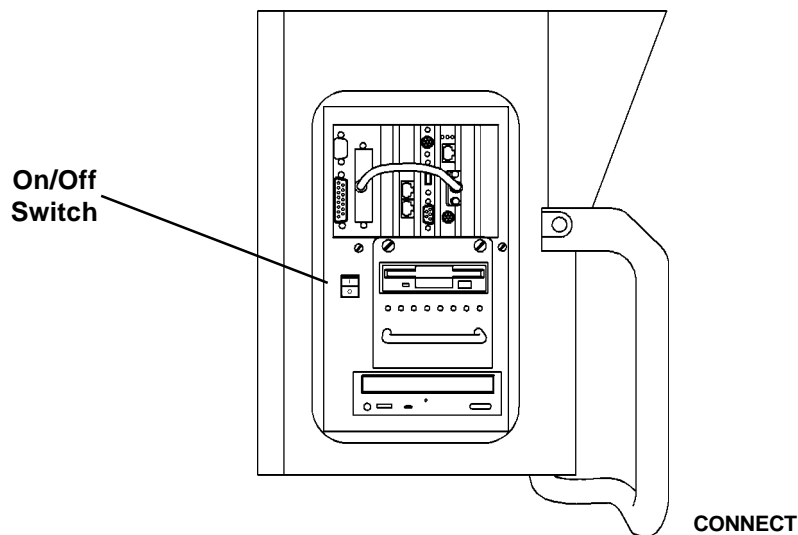


Figure 9-2. Computer On-Off Switch

SECTION 9 SHUTDOWN

EXITING THE ORION CONTROL SYSTEM

To assure proper startup after the Orion Control System has been shut down, the shutdown sequence given below should be followed carefully.

Exit the Run/Programming Screen by touching the Exit Touchbutton. See Figure 7-2 in Section 7, Run/Programming Screen. The Main Screen will appear.

Exit the Main Screen by touching the Exit Screen Touchbutton. See Figure 6-1 in Section 6, Main Screen.

At this point one of two actions will take place.

If the system is set up to shut down automatically, the entire computer shut down process will proceed, up to the point where power must be shut off to the computer and the machine.

If the system is set up to be shut down manually, the WINDOWS Desktop Screen will appear, and the computer must be shut down following the WINDOWS shut down procedure.

WINDOWS SHUTDOWN PROCEDURE

Press the Start Touchbutton on the WINDOWS Desktop Screen (Figure 9-1). The WINDOWS Start Pop-Up Screen will appear.

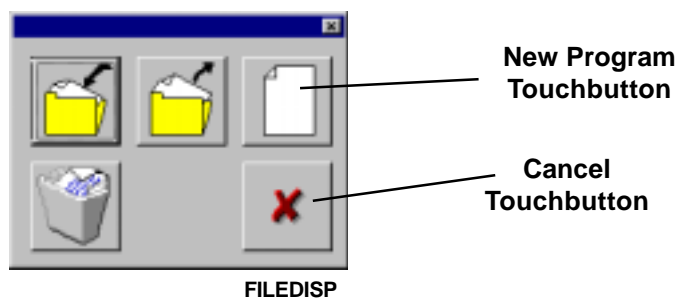
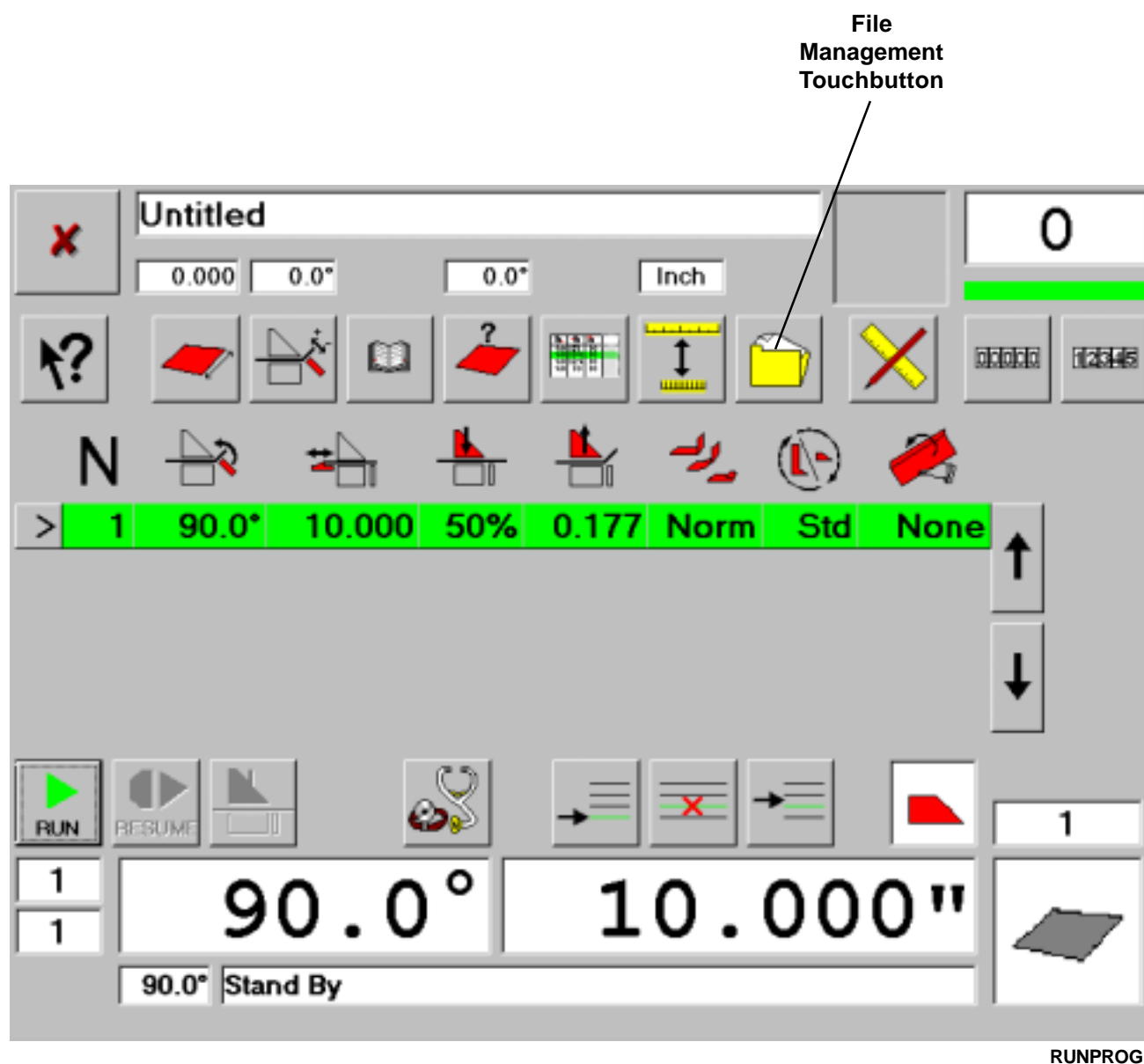
Press the Shutdown Touchbutton on the WINDOWS Start Pop-Up Screen. The Confirmation Pop-Up Screen will appear.

Be sure the dot is in the circle in front of the "Shutdown" prompt in the Confirmation Pop-Up Screen. Press the Yes Touchbutton. The WINDOWS shutdown process will begin. When it is finished, the Shutdown Message will appear, at which time the computer power can be turned off.

SHUTTING OFF POWER

It is not necessary to shut off the computer, but we recommend doing so to avoid any power-on complications when the machine is sitting idle. Shut off the computer power using the On/Off Switch shown in Figure 9-2.

Shut off machine power according to machine shutdown instructions.



SECTION 10

MANUAL PROGRAMMING

Programs can be prepared for the Orion Control System in two ways. Manual programming is described in this section. The other method, graphic programming, is described in Section 11, Graphic Programming.

In manual programming, programs are prepared by entering numerically, and by selecting symbols (tooling changes and material handling).

It is not necessary to enter data in the order in which it is presented in this section. The order shown, however, is a systematic approach, and will avoid inadvertently leaving out information which may be needed.

Changes can be made to a manual program, either during preparation, or at a later time. They must be made using manual programming methods. Graphic programming techniques will not alter programs developed by manual programming.

GETTING STARTED

To begin manual programming, touch the File Management Touchbutton to bring up the File Management Pop-up Screen shown in Figure 10-2.

Begin manual programming by touching the New Program Touchbutton shown in Figure 10-2. This alerts the system to the fact that a new program is being prepared. This step is not mandatory, but if it is skipped, saving the file is done somewhat differently (see Section 12, File Management.)

When the New Program Touchbutton is touched, the File Management Pop-up Screen disappears, and programming can begin.

CANCEL TOUCHBUTTON

If the Cancel Touchbutton is touched, the File Management Pop-up Screen disappears.

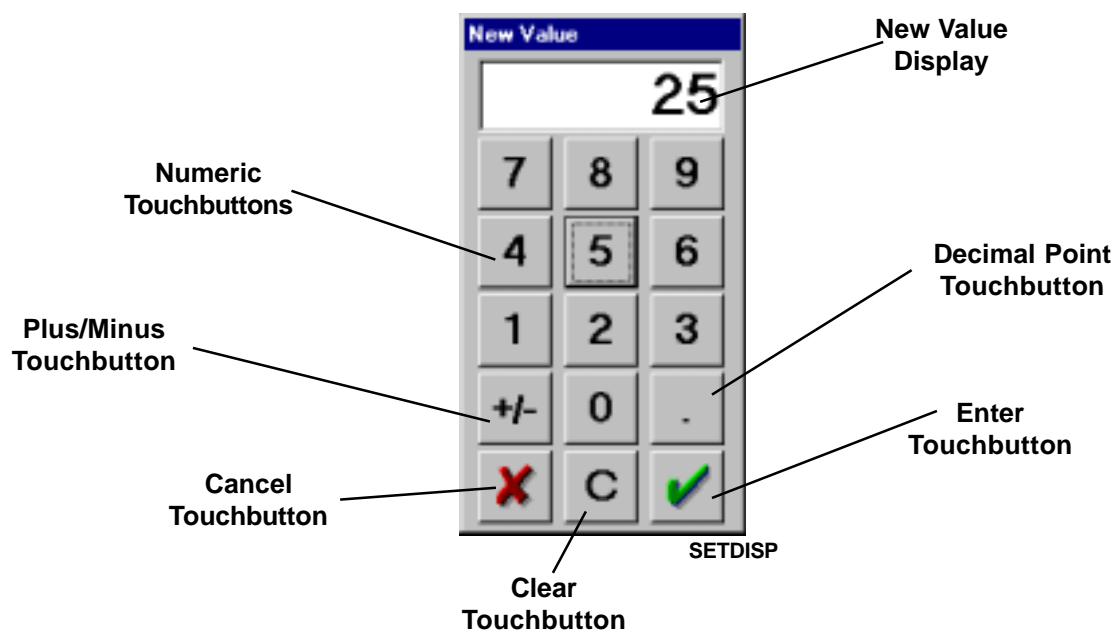


Figure 10-3. The Numeric Pop-Up Keypad

**ENTERING
PROGRAMMING
DATA**

There are two means of entering numeric and textual data into a program. Both means are through pop-up keypads which appear in response to an indication that data must be entered.

**NUMERIC
POP-UP
KEYPAD**

The Numeric Pop-Up Keypad, shown in Figure 10-3, always appears when numeric data must be entered. It is always located at the extreme right-hand side of the screen.

Numeric data is entered by using the Numeric Touchbuttons. As the data is entered, it appears in the New Value Display at the top of the keypad. A decimal point is entered by using the Decimal Point Touchbutton.

Numeric values can be made positive or negative by using the Plus/Minus Touchbutton, which can be used at the beginning of an entry, or at any point after numeric data is entered. The system will convert any negative values to positive in any instance where negative values are not allowed.

A numeral can be removed from the New Value Display by touching the Clear Touchbutton. When this touchbutton is used, it removes one number at a time, starting from the right.

The New Value Display can be cleared completely by touching the Cancel Touchbutton.

When the value shown in the New Value Display is the value desired, the Enter Touchbutton is used to enter it into the program. The value in the New Value Display then moves to the appropriate display, and the Numeric Pop-Up Keypad disappears from the screen.

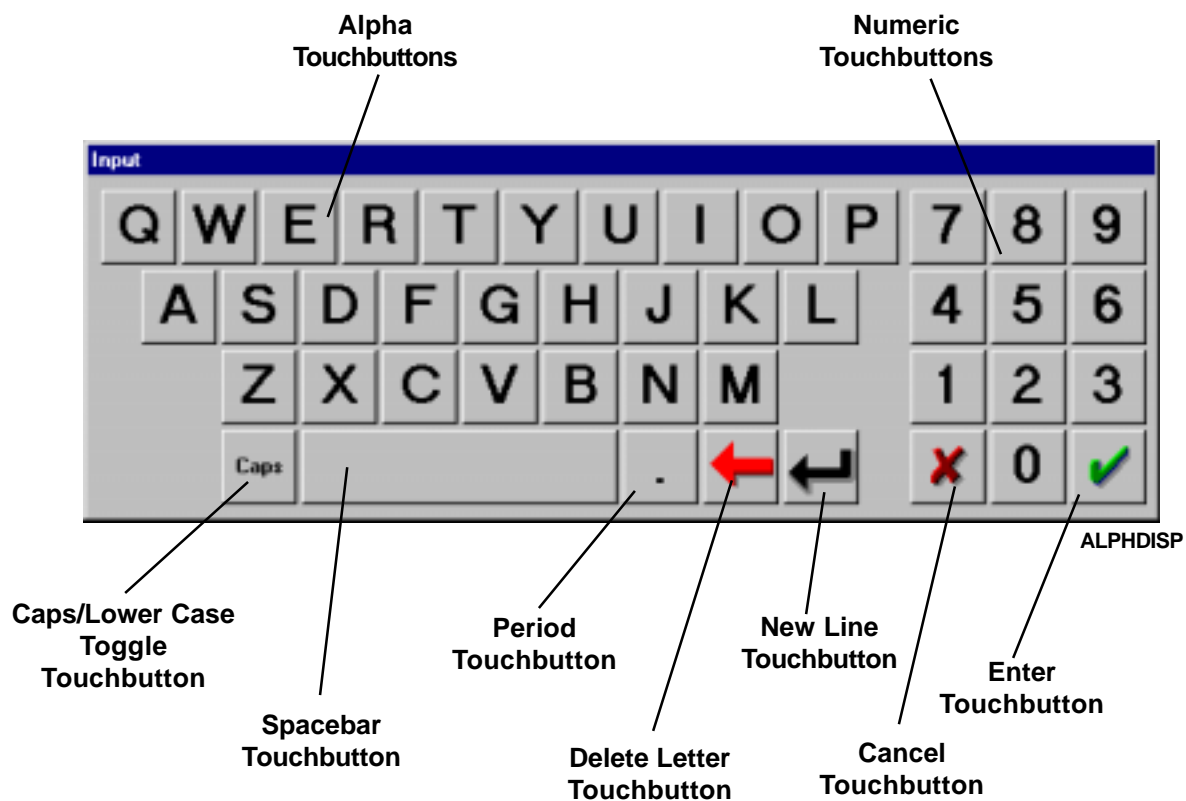


Figure 10-4. The Alpha-Numeric Pop-Up Keypad

**ALPHA-
NUMERIC
POP-UP
KEYPAD**

The Alpha-Numeric Pop-Up Keypad, shown in Figure 10-4, always appears when text-type data must be entered. It is always located at the bottom of the screen.

Textual data is entered by using the Alpha Touchbuttons. Numbers are entered by using the Numeric Touchbuttons. The Period Touchbutton is used to enter a period in the text. Spaces between words are added by using the Spacebar Touchbutton. Use the Upper/Lower Case Toggle Touchbutton to change from upper to lower case and back again. When this toggle is used, it automatically changes the Alpha touchpads from one case to the other.

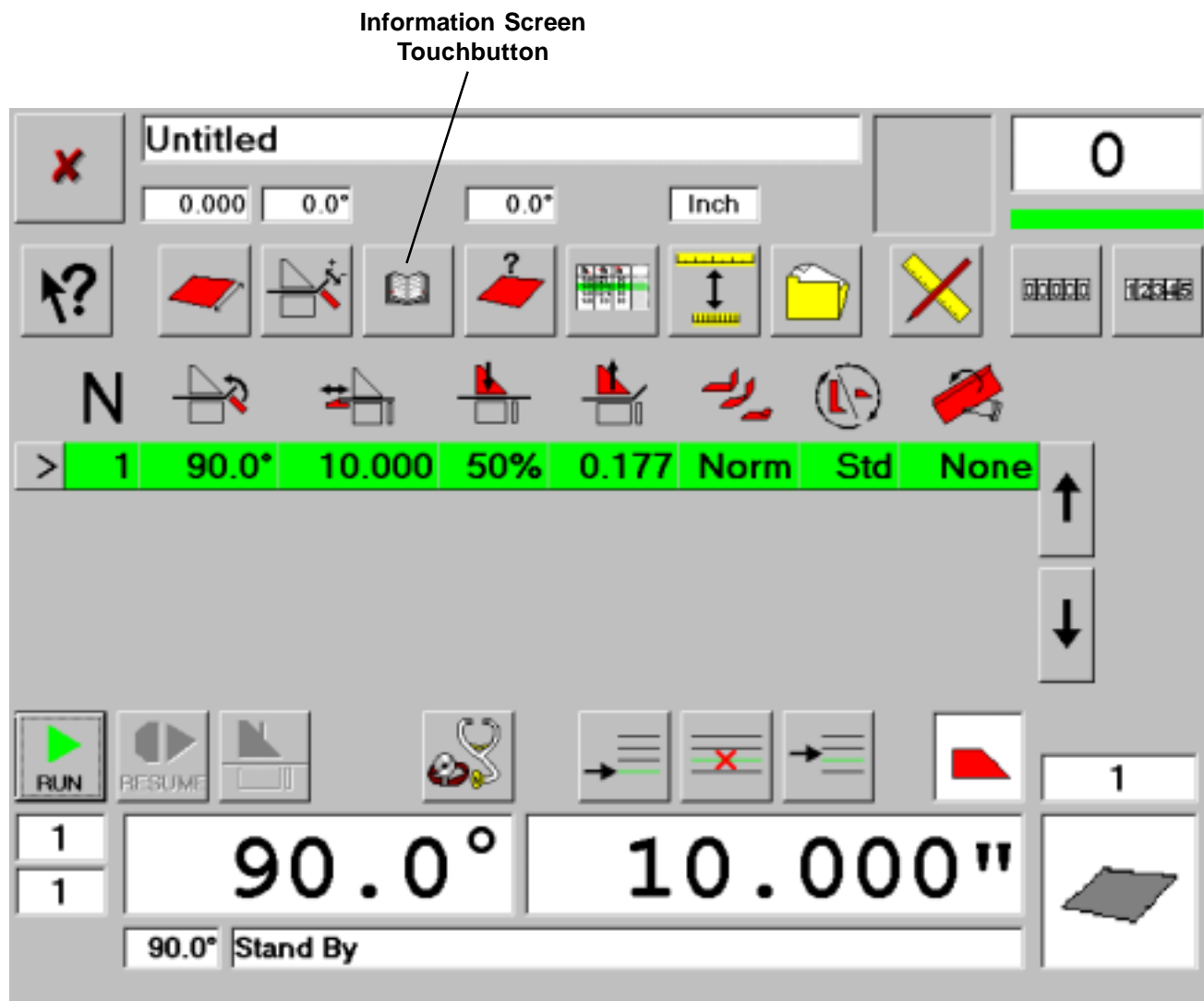
A new line can be started in certain displays by touching the New Line Touchbutton.

It must be remembered that numerals entered from this pop-up keypad contain no mathematical value; they are treated as alphabetical characters instead. This does not preclude the use of numerals for identification or description purposes. For instance, a program title such as "3.500 inch J Channel" can be entered, but the "3.500" portion of the entry carries no mathematical value within the program.

A character or space can be removed by touching the Delete Letter Touchbutton. When this touchbutton is used, it removes one character at a time, starting from the right.

The entry can be cleared completely by touching the Cancel Touchbutton.

When the entry shown is that desired, the Enter Touchbutton is used to enter it into the program. If the entry is in a pop-up display, it moves to the appropriate display and the pop-up display disappears. The Alpha-Numeric Pop-Up Keypad then disappears from the screen.



RUNPROG

Figure 10-6. Entering General Program Information

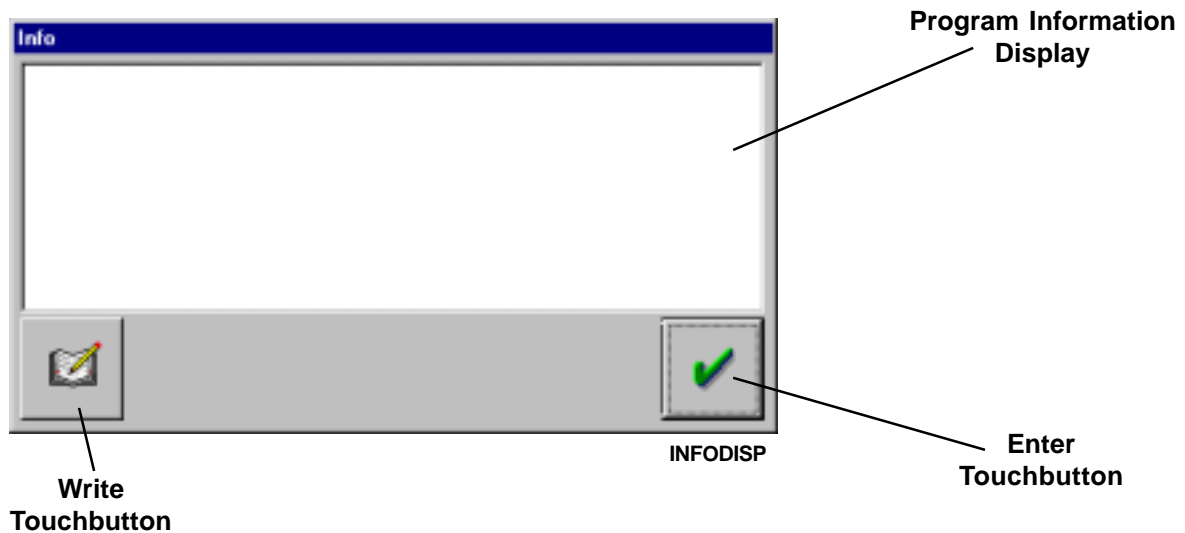


Figure 10-7. The Program Information Display

**ENTERING
GENERAL
PROGRAM
INFORMATION**

General program information consists of such items as material description, material handling tips, and other information which may be of use to the operator. Once entered, it appears on the Program Information Display shown in Figure 10-7. The Information Display has no effect on the program, and, can be left blank.

Information can be added or edited according to the procedures described below.

**ACCESSING
THE
INFORMATION
DISPLAY**

The Information Screen Display is accessed by pressing the Information Screen Touchbutton shown in Figure 10-6. The Program Information Display shown in Figure 10-7 then appears. For new programs, the Display will be blank. Existing programs being modified will show any information previously entered.

**ENTERING
DATA**

To enter data, touch the Write Touchbutton. The Alpha-Numeric Pop-Up Keypad, shown in Figure 10-4, will appear at the bottom of the display. Enter the desired information. As the entry is made, it will appear in the Program Information Display.

If information is to be modified, touch the Delete Letter Touchbutton and erase the entry up to the point where the new information is to be incorporated. Then enter the new information, followed by any information deleted but still valid.

**CLOSING THE
DISPLAY**

Once the data entered in the Program Information Display is correct, touch the Enter Touchbutton to incorporate it into the program file. At this point, the Alpha-Numeric Pop-Up Keypad will disappear.

The Program Information Display will remain on the Screen. Press the Enter Touchbutton on the Display to close it.

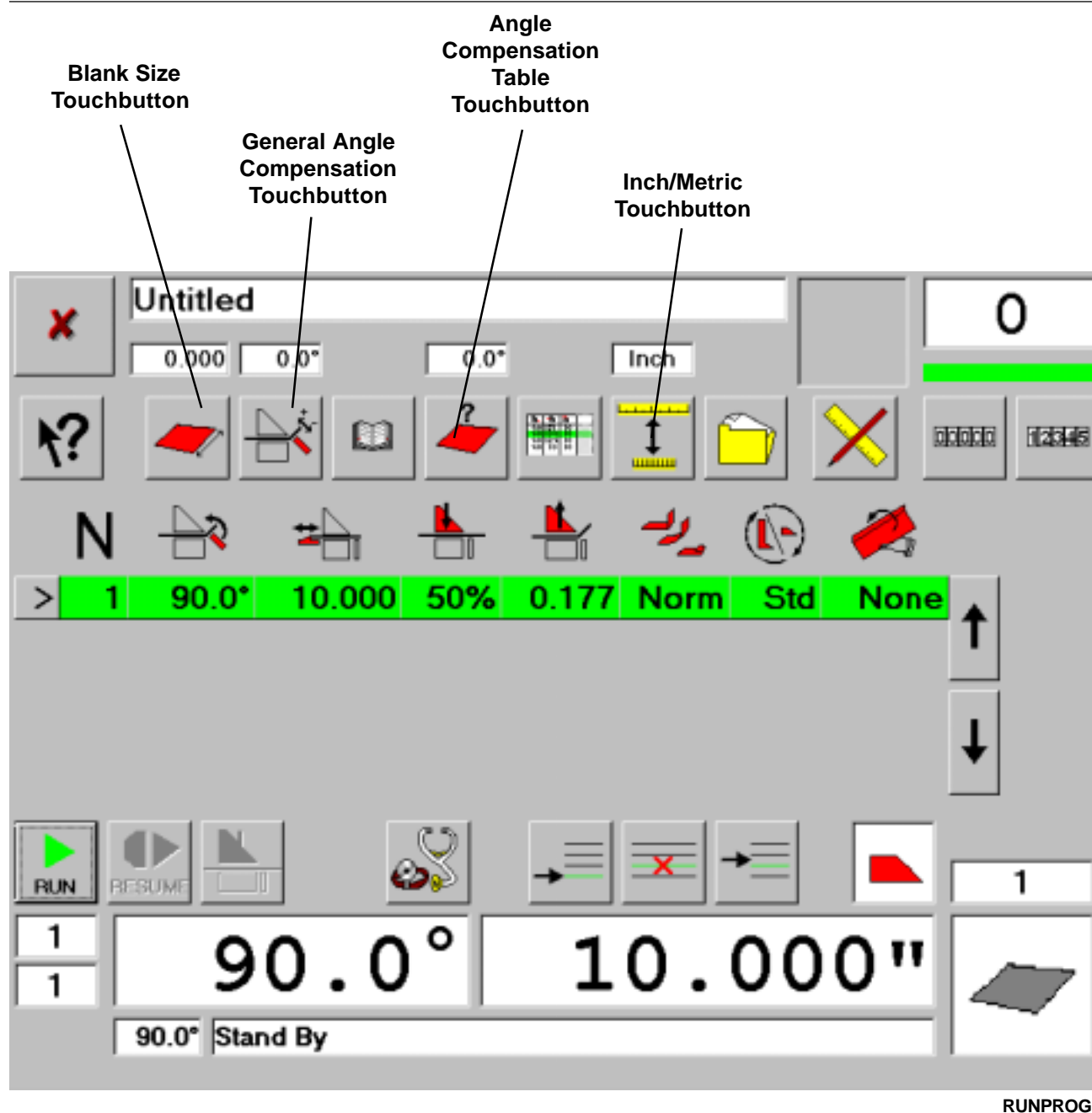


Figure 10-8. Setting General Program Parameters

**ENTERING
OVERALL
PROGRAM
VALUES**

Certain values can be set at the beginning of programming, and they will apply throughout the program. Some of them can be overridden for specific steps in the program. They can all be changed during programming, or later, when a program is called up for use.

**SELECTING
UNIT OF
MEASURE**

The first step in programming is selecting the unit of measure, which can be either inch or metric. This is done by using the Inch/Metric Touchbutton to toggle to the desired value.

**ENTERING
BLANK SIZE**

Touch the Blank Size Touchbutton to enter the size of the blank being used for the program. The Numeric Pop-Up Keypad (shown in Figure 10-3) will be used to enter this value. The value will always be positive. This information is optional.

**ENTERING
GENERAL
ANGLE
COMPENSATION**

Touch the General Angle Compensation Touchbutton to enter a compensation factor which will pertain to all operations within the program. This value is added to the programmed value of the specific bend. The Numeric Pop-Up Keypad will be used to enter this value. The value can be positive or negative to accomodate the characteristics of the material being used. This information is optional.

**ANGLE
COMPENSATION
TABLES**

Angle Compensation Tables take the place of general angle compensation values. Like the general angle compensation values, they are added to the programmed value of the specific bend. They are developed by testing various materials, taking into account width and thickness being bent. No Angle Compensation Tables are supplied with the machine; it is left to the owner of the equipment to develop these tables.

Touch the Angle Compensation Table Touchbutton to use values from an Angle Compensation Table. The Pop-Up Selection Screen shown in Figure 10-9 will appear. This information is optional.

**CREATING
ANGLE
COMPENSATION
TABLES**

The procedures used to create Angle Compensation Tables are provided in Appendix B, Machine Parameters.

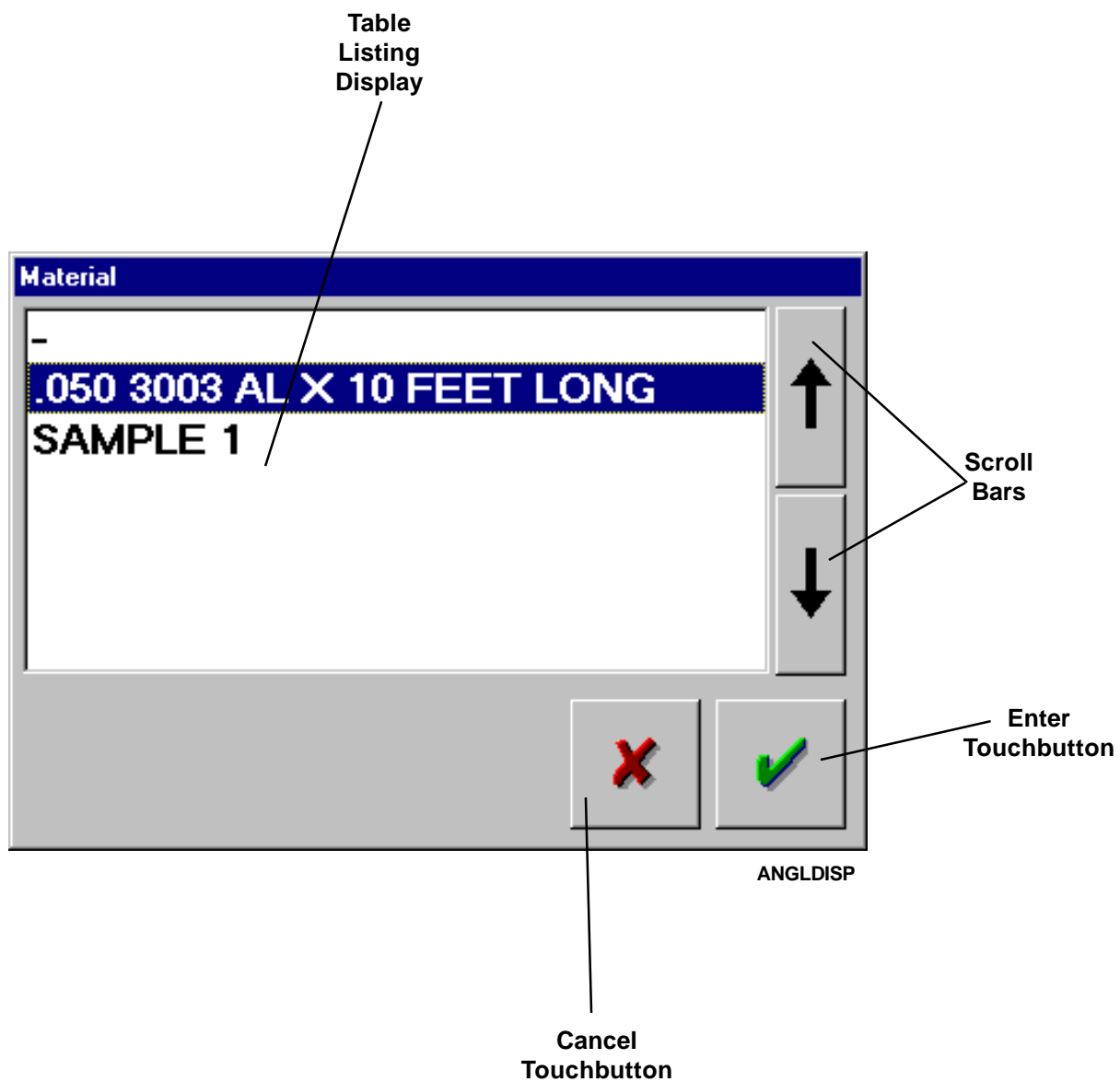


Figure 10-9. Angle Compensation Table Pop-Up Selection Screen

SELECTING AN ANGLE COMPENSATION TABLE Existing Angle Compensation Tables will be listed in the Table Listing Display of the Angle Compensation Table Pop-Up Selection Screen shown in Figure 10-9. Based on material, select the table to be used by touching the listing in the display. (If no tables exist, the word "None" will be the only listing shown.)

The angle compensation for the current operation appears in the window above the Angle Compensation Tables button. As you scroll through the program, the compensation value will change according to the angle programmed. This allows for great flexibility when forming materials that have varying angles and springback.

To remove the effects of any compensation table, open the list of tables and select "NONE". This will remove any table-created angle compensation from the part program, and will restore the value of zero to the associated window.

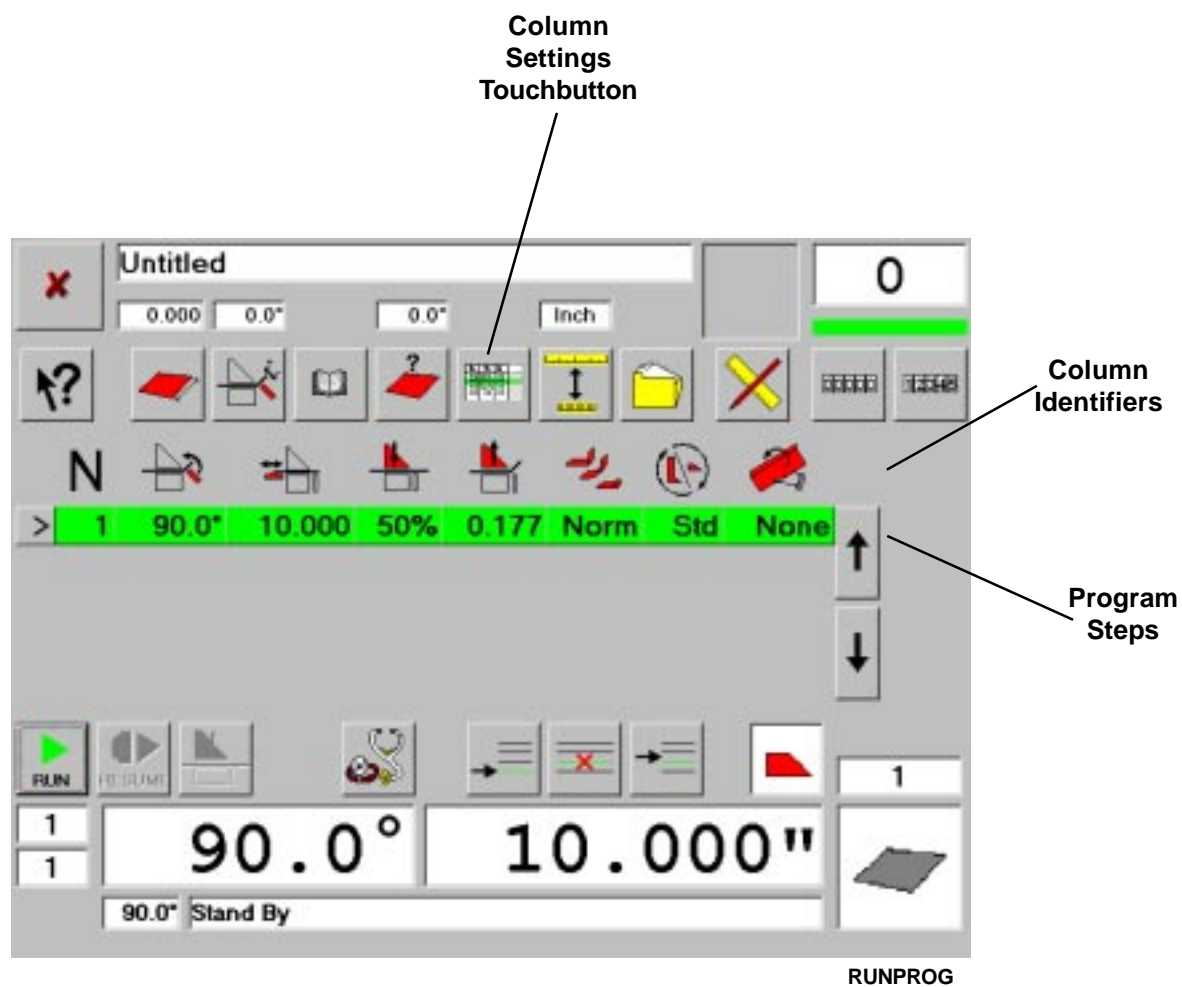


Figure 10-10. Choosing the Programming Columns

SELECTING THE PROGRAMMING COLUMNS

The total number of columns available for the program is greater than the screen can accommodate. Certain columns are always on the screen, and are vital to the program. Others are used only as needed. All the necessary columns can be accommodated on the screen at the same time, but the “as-needed” columns may be hidden. If a column does not appear on the screen, programming data contained in that column will still affect the program. An explanation of the columns available accompanies Figure 10-11.

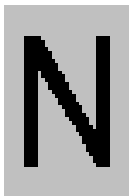
Columns displayed on the screen are identified by the row of column identifiers across the screen above the program steps.

Before entering program data, it is wise to set the number of columns to suit the program. Touch the Column Settings Touchbutton to bring up the Column Settings Pop-Up Display shown in Figure 10-11.

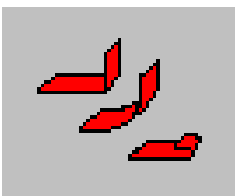
Needed for Each
Operation
Always Visible on
Screen

Needed for Each
Operation
May Be hidden

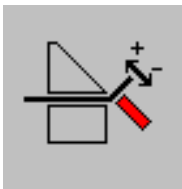
Special Values
Not Required
Usually hidden



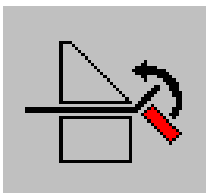
Operation
Number



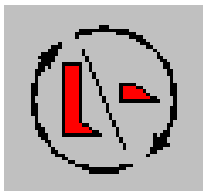
Bend Type



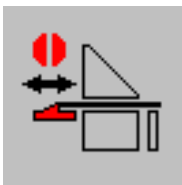
Angle
Compensation



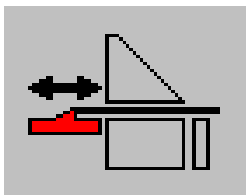
Bend Angle



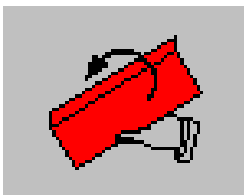
Tooling Position



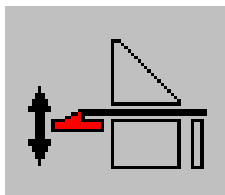
Backgauge
Pause



Backgauge
Position

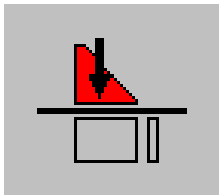


Material Handling



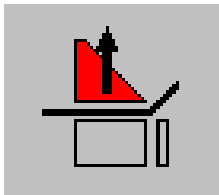
Backgauge
Height Position

Note: Numbers in parentheses indicate the order in which the columns will appear. If a column is not used, it is dropped from the order.



Clamping
Pressure

ARTNOS		
ENN	BENDTYPE	ANGCOMP
BENDANG	TOOLPOS	BACKPSE
BACKGAGE	MATLHAND	BACKHT
CLAMPPSI		
OPENHT		



Open Height



Column Setting
Pop-Up Display

COLDISP

Enter
Touchbutton

Figure 10-11. Selecting Columns and Their Symbols

**SELECTING
INDIVIDUAL
COLUMNS**

When the Column Settings Pop-Up Display appears, select the desired columns by touching the appropriate Column Symbols Touchbuttons.

Note that some Column Symbols remain on the screen at all times; these Column Symbols cannot be removed from the screen.

If a Column Identifier appears on the screen, and you wish to remove it, touch the corresponding Column Symbols Touchbutton in the Pop-Up Display. Once removed, touch the Touchbutton again to replace it.

If a Column Symbol is not on the screen, touch the appropriate touchbutton in the Pop-Up Display to place it on the screen. Once on the screen, touch the Touchbutton again to remove it from the screen.

When the desired columns are shown on the screen, touch the Enter Touchbutton to remove the Pop-Up Display from the screen.

.

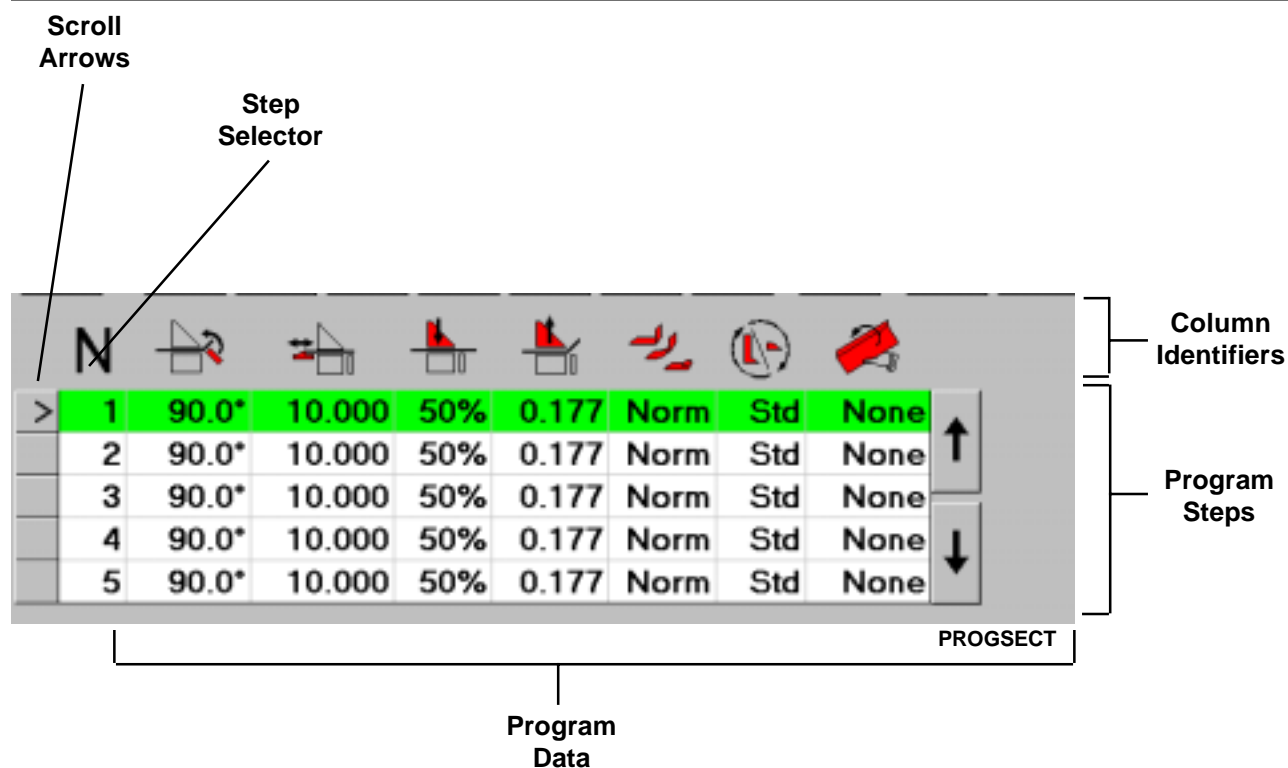


Figure 10-12. The Part Program Section of the Run/Programming Screen

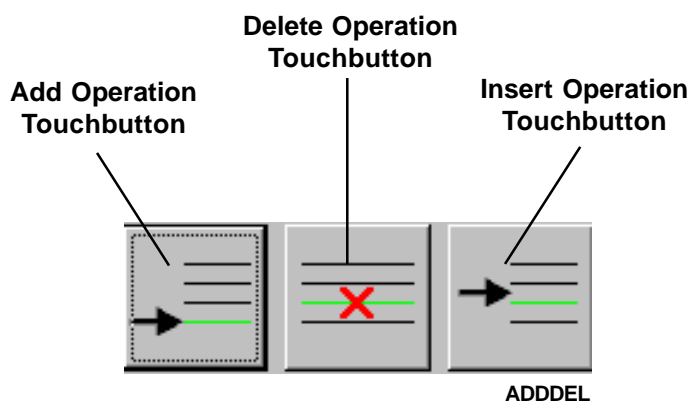


Figure 10-13. Operation Touchbuttons

PROGRAMMING INDIVIDUAL BENDS

The typical part program contains several bending operations. Each bending operation comprises one step in the program, and is displayed as a single row, or line, in the program steps portion, shown in Figure 10-12, of the Run/Programming Screen.

SCROLLING THROUGH THE PROGRAM

Many programs will contain more steps than can be shown on the screen at one time. The Scroll Arrows are used to scroll up or down within the program to examine, change, or program the various steps.

DEFAULT VALUES

At the beginning of the programming activity involving individual bends, a single row, or line, is shown on the screen. Each column in this row contains a default value, which must often be modified to suit the bend being programmed. Default values can be modified to match your need more closely according to the procedure in Section 13, Machine Parameters.

As more bends are added to the program, more rows are added. When each row is added, the new row contains the default values, and these values must also be modified, as required.

ADDING AND DELETING PROGRAM STEPS

Rows for operational steps are added or deleted using the Operation Touchbuttons shown in Figure 10-13. It is recommended that operational steps be entered in the order in which they occur.

Touching the Add Operation Touchbutton always adds a row at the end of the program. When this row is added, it is also highlighted in green.

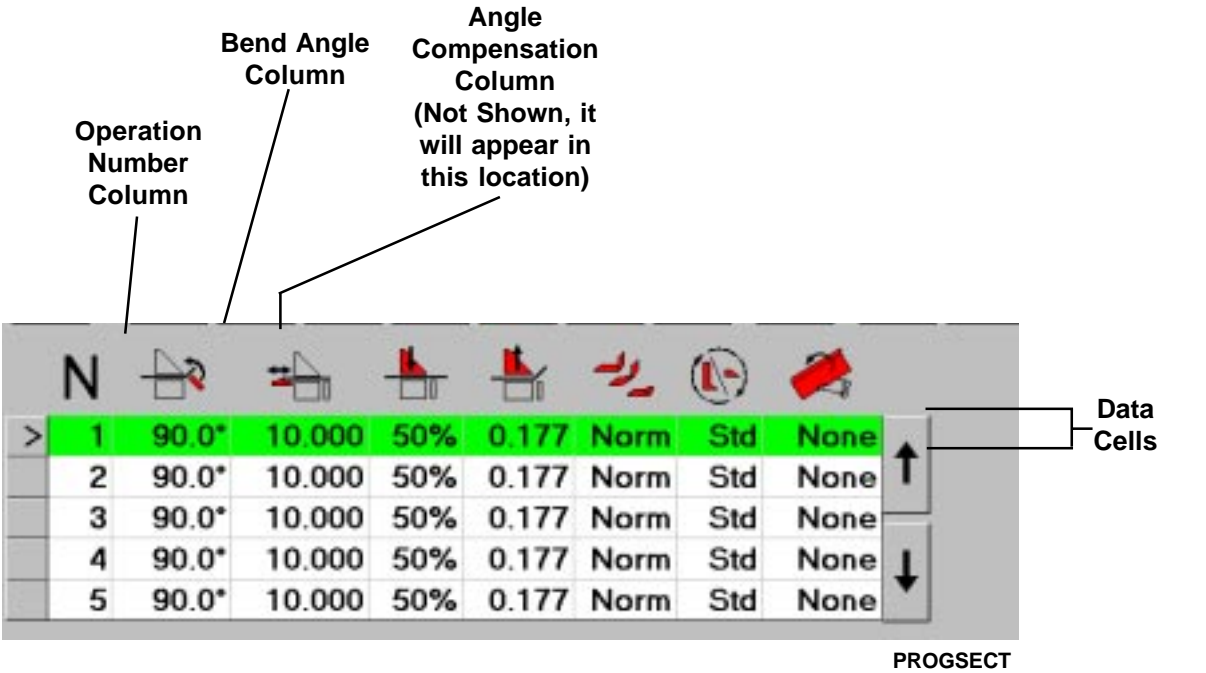
To delete a row, select it by touching the small square in the Step Indicator Column to highlight the row. Touch the Delete Operation Touchbutton and the highlighted row disappears from the screen. The steps following the deleted step are renumbered so they are consecutive with those preceding the deleted row.

CAUTION

DELETION OF A ROW IS PERMANENT.

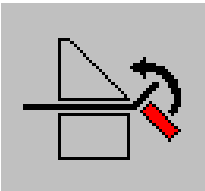
If a row is unintentionally deleted, a new row must be created, and the information must be re-entered.

To add a step, or row, between two existing steps, touch the Square in the Step Indicator Column below the point where the new step is to be added. Touch the Insert Operation Touchbutton and a new row, containing the default values, appears. The new row is highlighted in green. The steps following the added step are renumbered so step numbers remain sequential.



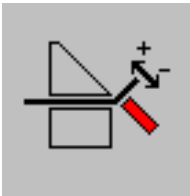
ENN

Operation Number Column



BENDANG

Bend Angle Column



ANGCOMP

Angle Compensation Column

Figure 10-14. Entering the Operation Number, Bend Angle, and Specific Angle Compensation

ENTERING PROGRAM DATA

Data may be entered in any order desired, but it is recommended that it be entered systematically, with all the data for an operational step entered before the next step is begun. If changes to any operation are necessary, they can be made at any point in the programming process.

To enter data in any “data cell” (see Figure 10-14) of a program step, simply touch the cell. The row in which the cell is situated will highlight in green, and the cell itself will highlight in red. At the same time, the appropriate Pop-Up Display will appear.

Enter a numerical value, or select from the choices presented. Because various Pop-Up Displays react differently upon data entry, each is identified by data type.

CAUTION

DO NOT HIGHLIGHT A “CELL” BY TOUCHING THE COLUMN SYMBOL .

This highlights the entire column, and the data entered in the desired cell is also entered in all cells in that column.

ENTERING THE OPERATION NUMBER

The Operation Number is entered and maintained automatically by the system as the program is developed. The programmer does nothing to enter this number.

ENTERING THE BEND ANGLE

For each bend which does not match the default value shown, the programmer must enter the desired bend angle in the Bend Angle Column. When the cell in the bend angle column is selected, the Numeric Pop-Up Keypad (Figure 10-3) appears. The operator enters the bend angle, which appears in the New Value Display of the Keypad. The programmer transfers the new value to the selected cell by touching the Enter Touchbutton, and the Keypad disappears.

GENERAL ANGLE COMPENSATION

During operation, the system adjusts the programmed bend angle, using the General Angle Compensation value entered in the system, or the value selected with an Angle Compensation Table. These compensation values are cumulative, that is, they are added to the programmed bend angle (negative values reduce the bend angle).

ANGLE COMPENSATION FOR SPECIFIC BENDS

From time to time, a specific bend may require angle compensation different from the General Angle Compensation. To apply such specific compensation, it is necessary to include the Angle Compensation Column (see Figure 10-11) in the program, and enter the specific compensation in the appropriate cell in this column. Once the program is completed, the Angle Compensation Column can be hidden once again. During operation, its value will be added to the programmed bend angle in addition to the general angle compensation selected for the program. When the Angle Compensation cell is selected, the Numeric Pop-up Keypad appears, the specific value is entered, and the Enter Touchbutton is used to transfer the value to the program.

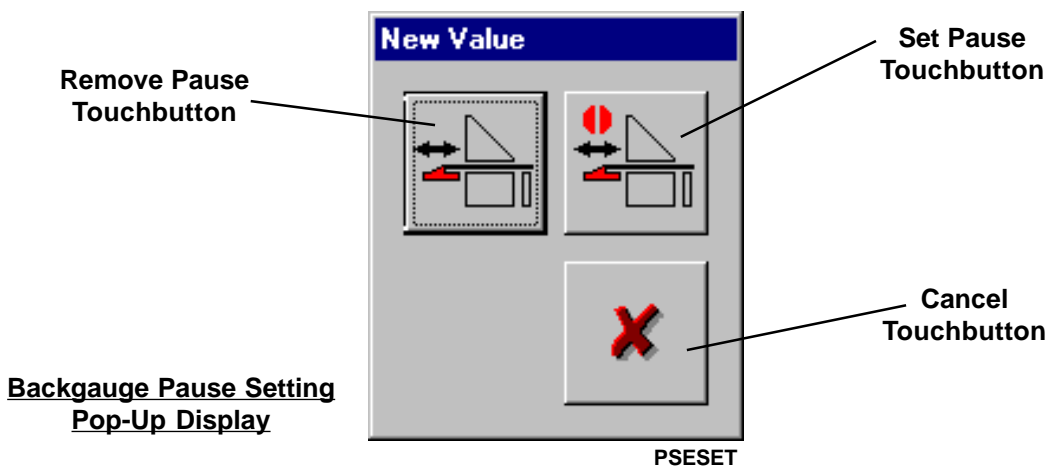
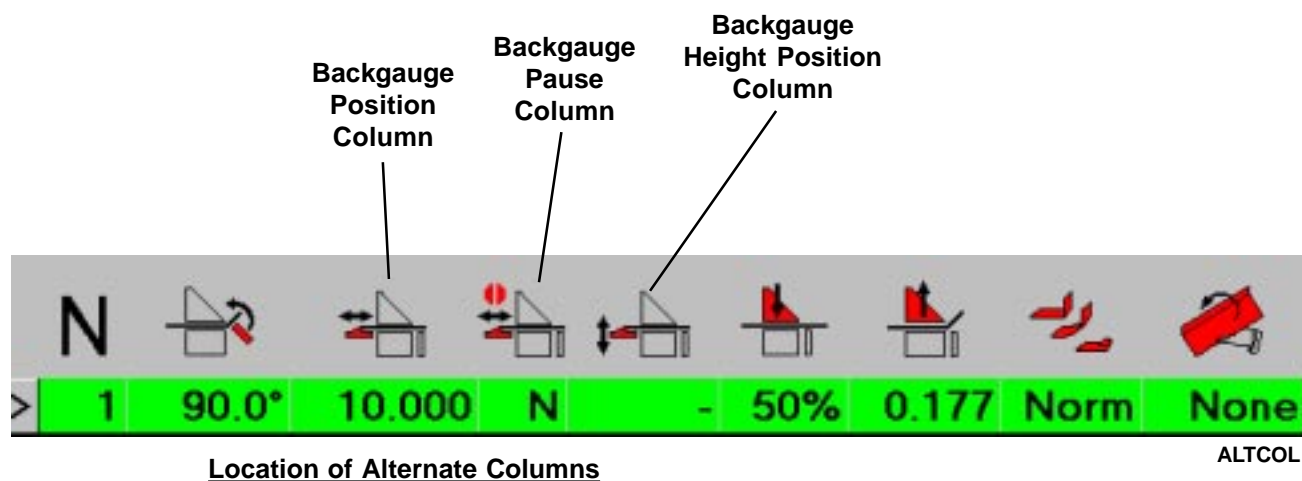


Figure 10-15. Entering Backgauge Program Data

ENTERING BACKGAUGE DATA

The Backgauge Position Column lists the programmed location of the backgauge stop as measured from the nose of the upper tooling. This dimension is required by the machine, and the Backgauge Position Column is always visible.

ENTERING THE BACKGAUGE DIMENSION

For each bend whose backgauge position dimension does not match the default value shown, the programmer must enter the backgauge dimension in the Backgauge Position Column. When the cell in the column is selected, the Numeric Pop-Up Keypad (Figure 10-3) appears. The operator enters the backgauge dimension, which appears in the New Value Display of the Keypad. The programmer transfers the new value to the selected cell by touching the Enter Touchbutton, and the Keypad disappears.

ENTERING A BACKGAUGE PAUSE FUNCTION

The Backgauge Pause Column provides a means to halt the motion of the backgauge and lower the backgauge fingers during any operation. The column is not required in a program unless the function is desired.

The value is programmed as “Yes” (backgauge paused) or “No” (normal backgauge function). The default is “No”. If the Backgauge Pause is set to “Yes”, then the backgauge will not move to the programmed position of the current operation until either the clamp or unclamp foot pedal is pressed. This gives the operator time to position or rotate the work material on the backgauge table without scratching it on the backgauge fingers.

When this column is to be used, the programmer touches the appropriate cell in the column. The Backgauge Pause Setting Pop-Up Display (Figure 10-15) appears centered in the lower portion of the screen.

The programmer touches the Set Pause Touchbutton to enable the function. “Yes” appears in the appropriate cell, and the display disappears. The programmer touches the Remove Pause Touchbutton to disable the function. “No” appears in the appropriate cell, and the display disappears. The Cancel Touchbutton removes the display without changing the setting.

After the pause function has been set, the Backgauge Pause Column can be hidden without removing the function.

SETTING THE BACKGAUGE HEIGHT POSITION

The Backgauge Height Position column contains the programmed vertical position of the backgauge table on those machines equipped with the Multifold feature. When a cell in this column is touched, the Numeric Pop-Up Keypad (Figure 10-3) appears. The operator enters the desired backgauge height, which appears in the New Value Display of the Keypad. The programmer transfers the new value to the selected cell by touching the Enter Touchbutton, and the Keypad disappears. If the feature is not included on the machine, the keypad will not appear.

After the height position has been set, the Backgauge Height Position Column can be hidden without removing the programmed value.

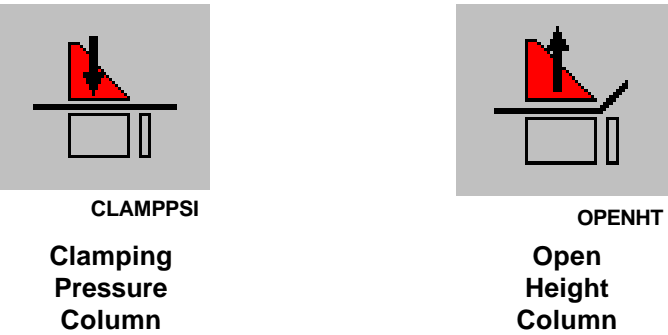
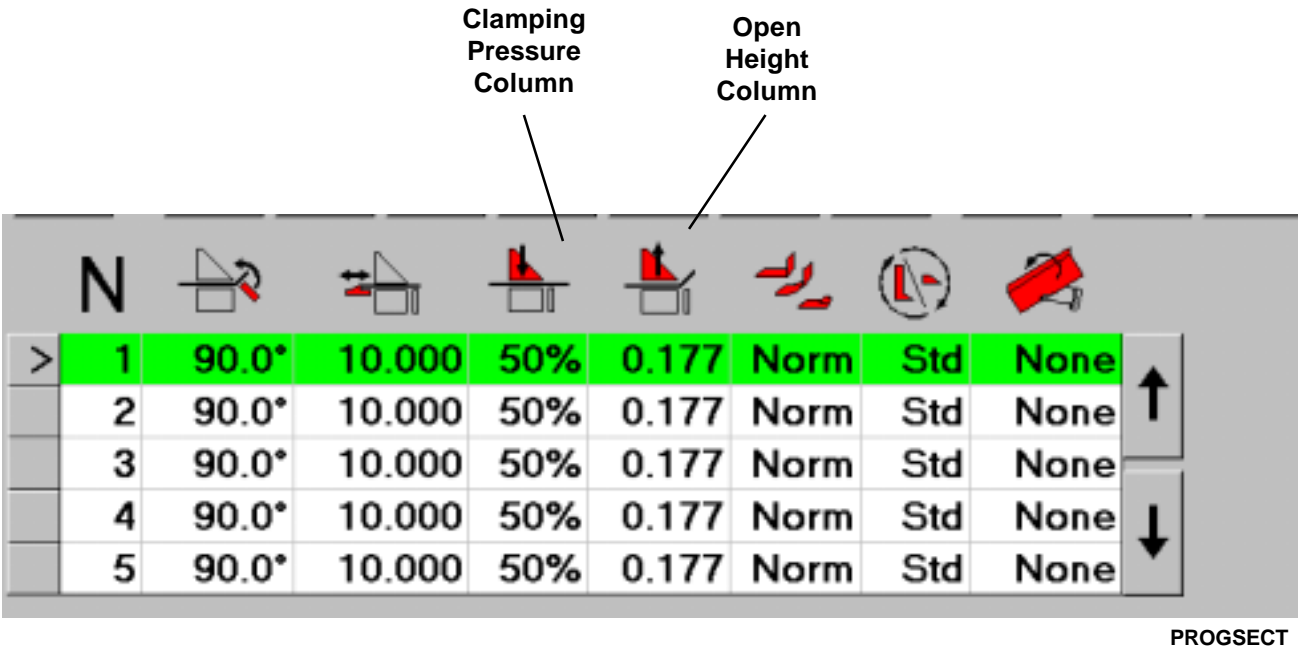


Figure 10-16. Entering Clamping Beam Data

**ENTERING THE
CLAMPING
PRESSURE**

The Clamping Pressure Column provides the programmed clamp pressure the upper tooling places against the work material. The pressure is expressed as a percentage of the maximum available, and applies to the current operation only. Therefore, each operation may have a different clamping pressure if desired. This pressure is required by the machine, and the Clamping Pressure Column is always visible.

For each bend where the required clamping pressure does not match the default value shown, the programmer must enter the clamping pressure in the Clamping Pressure Column. When the cell in the column is selected, the Numeric Pop-Up Keypad (Figure 10-3) appears. The operator enters the clamping pressure, which appears in the New Value Display of the Keypad. The programmer transfers the new value to the selected cell by touching the Enter Touchbutton, and the Keypad disappears.

**ENTERING THE
CLAMPING
BEAM OPEN
HEIGHT**

The Open Height column provides the programmed distance the upper beam will move upward after the current operation is complete. The upper beam will also move to this height prior to flattening a hem. If the programmed Open Height in the first operation is greater than the position of the beam when the machine is started, then the upper beam will raise until it reaches this position. This value is required by the machine, and the Open Height Column is always visible.

For each bend where the required Open Height does not match the default value shown, the programmer must enter the open height in the Open Height Column. When the cell in the column is selected, the Numeric Pop-Up Keypad (Figure 10-3) appears. The operator enters the open height, which appears in the New Value Display of the Keypad. The programmer transfers the new value to the selected cell by touching the Enter Touchbutton, and the Keypad disappears.

Bend Type Column

	N								
>	1	90.0°	10.000	50%	0.177	Norm	Std	None	↑ ↓
	2	90.0°	10.000	50%	0.177	Norm	Std	None	
	3	90.0°	10.000	50%	0.177	Norm	Std	None	
	4	90.0°	10.000	50%	0.177	Norm	Std	None	
	5	90.0°	10.000	50%	0.177	Norm	Std	None	

PROGSECT

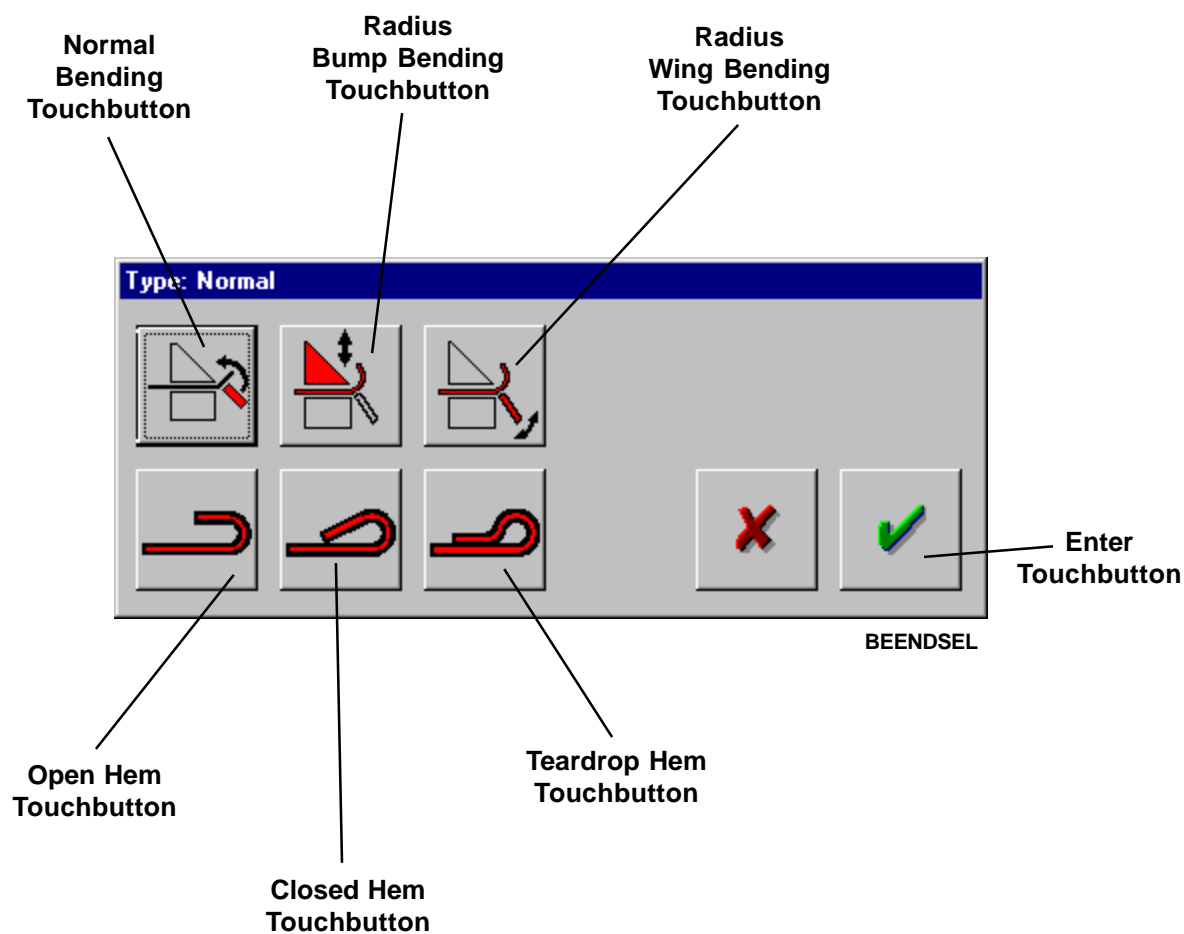


Figure 10-17. Selecting the Type of Bend

DEFINING THE TYPE OF BEND

It is necessary to identify the type of bend desired in each operation. Several bend types are available in the system. This information is contained in the Bend Type Column. The default value is "NORM", which requires no additional dimensional data.

The available types of bends are listed below, with their identifying codes and corresponding descriptions.

Code	Description
"NORM"	Normal bending
"Bump"	Radius Bump bending
"Wing"	Radius Wing bending
"OHem"	Open Hem
"CHem"	Closed Hem
"THem"	Teardrop Hem

SELECTING BEND TYPE

Touch the cell in the Bend Type Column to open the Bend Selection Pop-Up Display shown in Figure 10-17. Touch the desired bend type to be used in the current operation. When the type of bend has been selected and any necessary values have been entered, touch the Enter Touchbutton. The Bending Code appears in the Bend Type Column, and the Pop-Up Display disappears.

Additional Information on bending types appears below.

NORMAL BENDING

With Normal Bending, the material is clamped, and the bending beam moves to a position including the programmed bend angle plus any bending compensation. The bending beam returns to the home position, the clamping beam unclamps the part and moves to its upward position, and the next bending operation can commence.

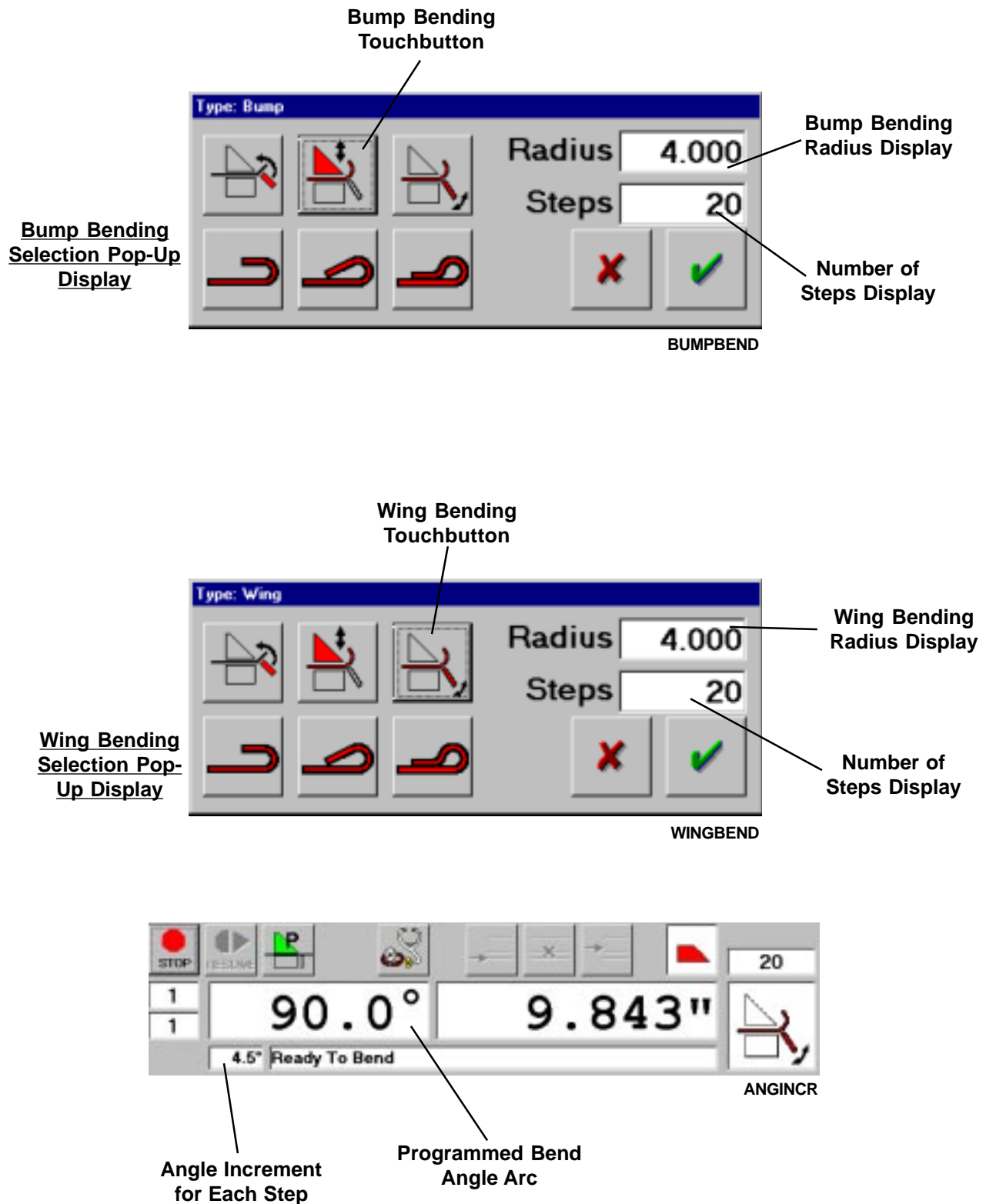


Figure 10-18. Radius Bending

**RADIUS
BENDING**

In radius bending, the material is formed in a series of steps, each being a fraction of the total programmed bend. Both the desired radius and the desired number of steps must be entered into the bend type selection. When the Display for either value is touched, the Numeric Pop-Up Keypad (Figure 10-3) appears. Enter the numeric value desired (the minimum number of steps for a radius bend is "3"), touch the Enter Touchbutton of the keypad to transfer the value to the Bend Display, repeat the entry steps for the second value, and touch the Enter Touchbutton for the Selection Pop-Up to transfer the data to the program.

The Orion control calculates any required bending beam and backgauge movements from the settings entered above. Additional angle compensation may be required to form the desired radius. Adding specific compensation only for the radius bending operation is recommended when compensating for springback in the work material.

The programmed arc of the radius bend is shown in the large display, and the bend angle increment for each step is shown in the small display.

**BUMP
BENDING**

In Bump Bending, the bend pedal is pressed to begin, and the bending beam rotates to its programmed position. Thereafter, the bending beam remains locked in this position. The clamp pedal is pressed and the upper beam clamps the material, making the first bend step of the radius. The upper beam unclamps automatically and the backgauge automatically feeds the material toward the operator. Then the upper beam reclamps, forming the second step of the bend, and the process repeats itself until the radius is completely formed. (If the clamp pedal is held down, the cycle is automatic, as described. If the clamp pedal is released, It must be depressed again to continue the cycle.) During this process it is necessary for the operator to hold the workpiece firmly against the backgauge because bending takes place during the clamping downstroke, when the material is free to move about.

**WING
BENDING**

In Wing Bending, the upper beam is clamped against the work material before each incremental step of the radius is formed. The bend pedal is then pressed, and the bending beam rotates to the incremental bend position. The process is repeated for each incremental bend until the radius is complete.

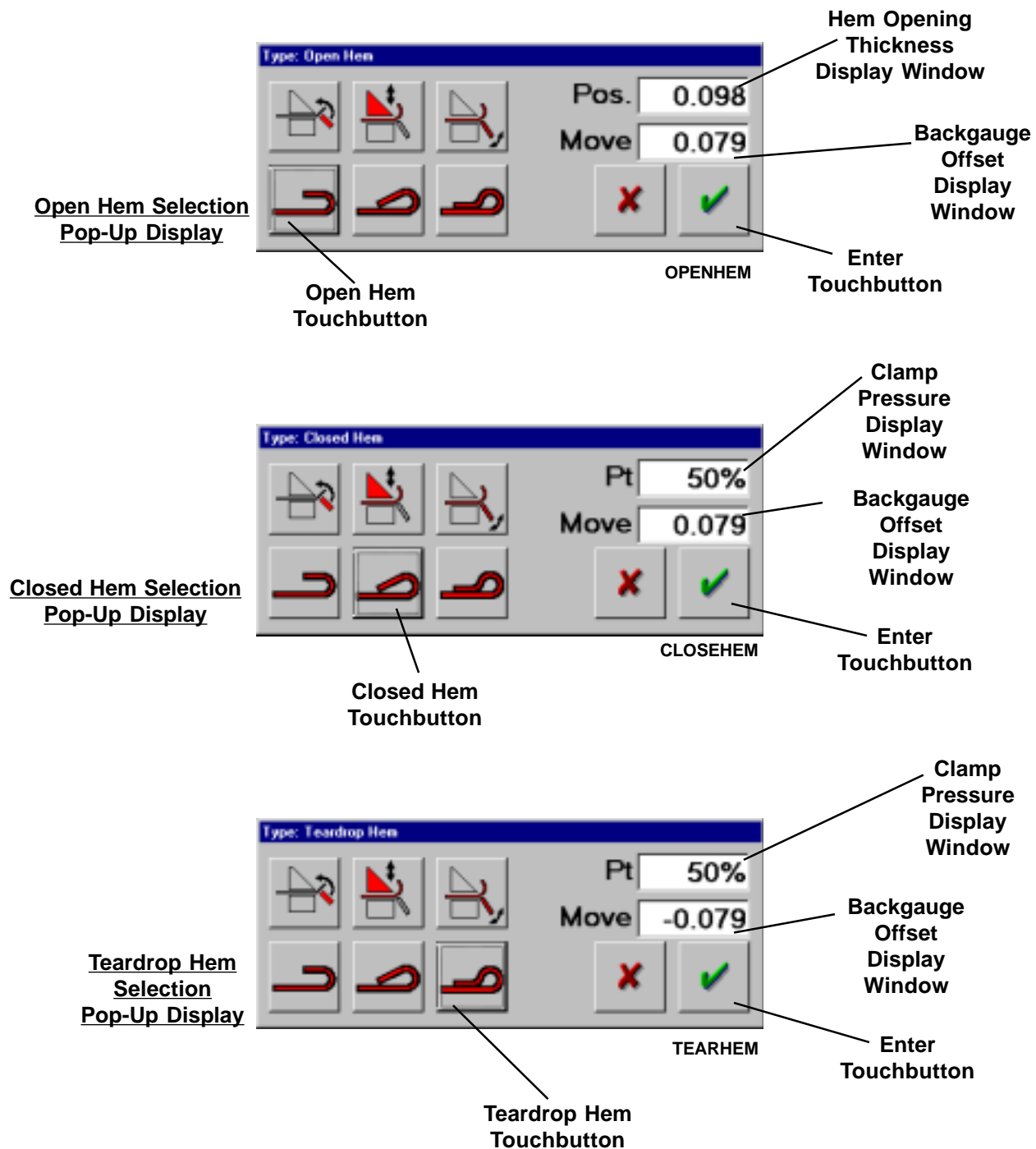


Figure 10-19. Hem Bending

HEM BENDING

Forming a hem is a two-step process. The part is pre-bent to the maximum angle possible. The flange being formed is then placed under the upper jaw, and the clamp jaws are closed to form the hem.

The backgauge offset positions the part so that the upper jaws clamp properly on the flange. Offset will vary depending on the size of the flange, and the hem being formed. The thickness and strength of the material may cause hems to be formed more at the end of the flange. Varying the backgauge offset allows some compensation for this.

OPEN HEMS

When an open hem is formed, the flange is bent until it is parallel to the adjacent material, but it is not flattened against the material. The hem is defined by its thickness, measured across the outside of the hem. The upper beam will use up to the maximum clamping power available to reach the desired configuration for the hem because no pressure is given.

**CLOSED
HEMS**

Closed hems are formed by clamping on the edge of the hem. When a closed hem is formed, the material is bent back upon itself so that the edge of the flange touches the material. The hem is influenced by the backgauge offset, which governs clamping position, and the pressure needed to bring the flange edge against the material. When forming thin materials use a pressure appropriate for the material; better results can often be achieved by lowering the pressure.

**TEARDROP
HEMS**

Teardrop hems are formed by clamping behind the edge of the hem. This flattens the edge of the hem against the material. This type of hem requires less pressure than that needed to for a closed hem. Therefore, thicker materials may be closed in a teardrop hem as compared to a closed hem. Also, if short flanges are used in the forming of the hem, bending a teardrop hem may yield more consistent results. When forming thin materials use a pressure appropriate for the material; better results can often be achieved by lowering the pressure.

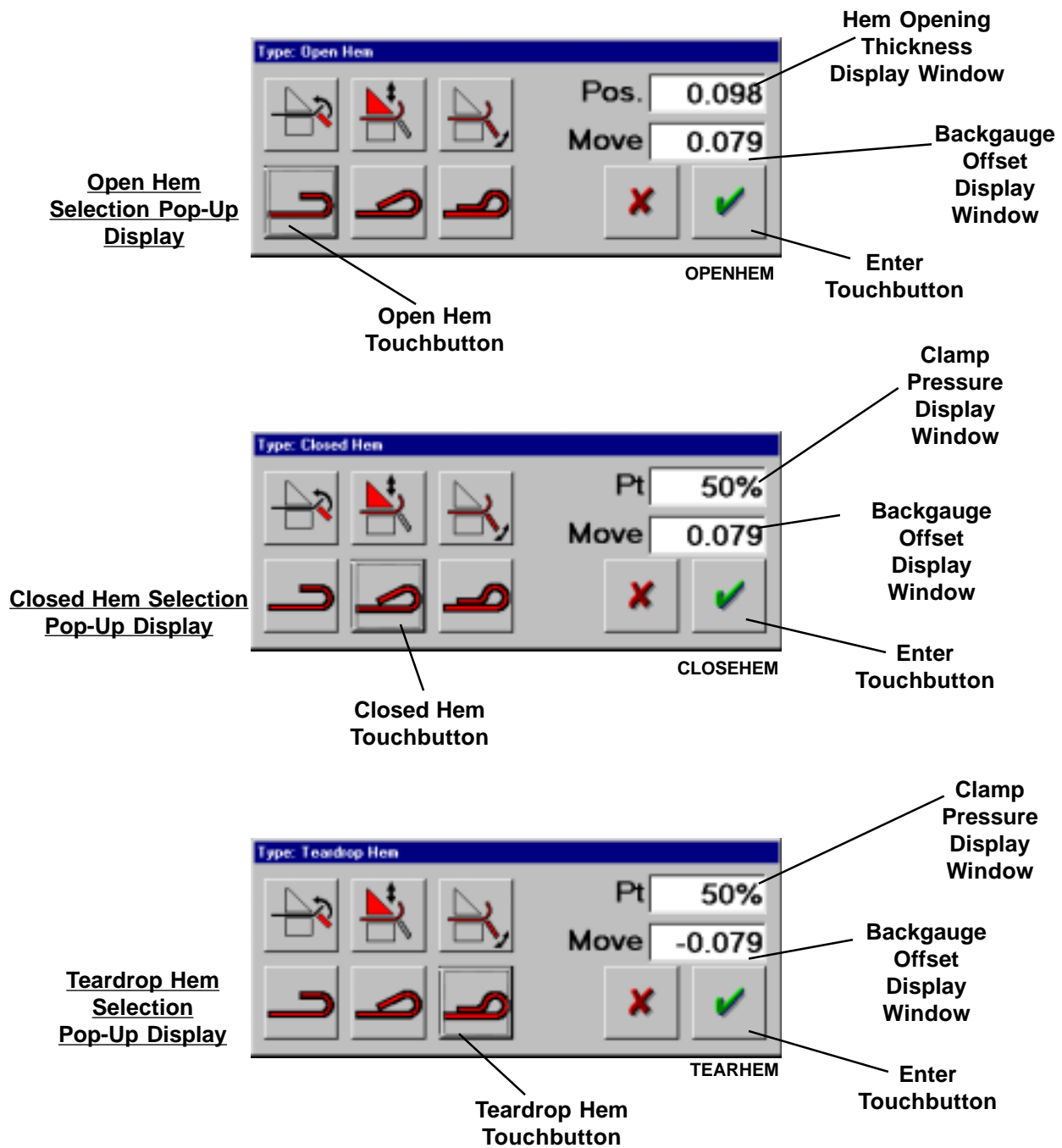


Figure 10-19. Hem Bending (Continued)

**ENTERING HEM
DATA**

Pressing a Hem Selection Touchbutton opens two display windows in the appropriate Selection Pop-Up Display, shown in Figure 10-19. To enter a value other than the default value shown, touch the display window which must be changed.

The Numeric Pop-Up Keypad (Figure 10-3) appears. Enter the appropriate data using the keypad, and then touch the Numeric Keypad Enter Touchbutton to transfer the value to the Display Window. The Numeric keypad will close. Repeat for the second Display Window.

When the Display Windows contain the correct data, touch the Enter Touchbutton to enter the data into the program. The Selection Display will disappear, and the appropriate code will appear in the cell of the Bend Type Column.

**OPEN HEM
BENDING**

When Open Hem is selected as the bend type, the Bend Angle Column changes to show the maximum angle allowed in the Machine Parameters. In addition to the backgauge offset position (bottom window), the hem dimension across the outside of the material at the hem (top window) must be entered.

When the hem data is entered into the program, the code "OHem" appears in the cell in the Bend Type Column.

**CLOSED HEM
BENDING**

When Closed Hem is selected as the bend type, the Bend Angle Column changes to show the maximum angle allowed in the Machine Parameters. In addition to the backgauge offset position (bottom window), the hem pressure to be used to close the hem (top window) must be entered.

When the hem data is entered into the program, the code "CHem" appears in the cell in the Bend Type Column.

**TEARDROP
HEM BENDING**

When Teardrop Hem is selected as the bend type, the Bend Angle Column changes to show the maximum angle allowed in the Machine Parameters. The backgauge offset position (bottom window) will always be negative; if you enter a positive number, the machine will convert it to a negative number. The hem pressure to be used to close the hem (top window) must also be entered.

When the hem data is entered into the program, the code "THem" appears in the cell in the Bend Type Column.

Tooling Type Column

>	1	90.0°	10.000	50%	0.177	Norm	Std	None
	2	90.0°	10.000	50%	0.177	Norm	Std	None
	3	90.0°	10.000	50%	0.177	Norm	Std	None
	4	90.0°	10.000	50%	0.177	Norm	Std	None
	5	90.0°	10.000	50%	0.177	Norm	Std	None

PROGSECT

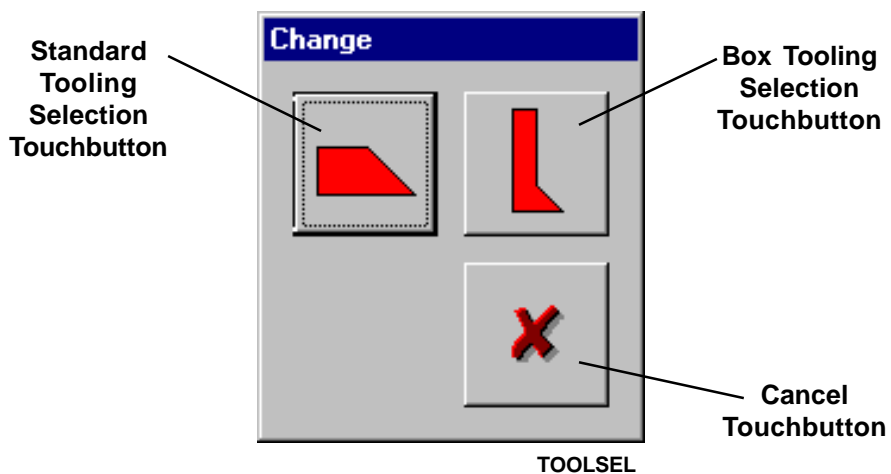


Figure 10-20. Tooling Selection Pop-Up Display

**ENTERING
TOOLING
DATA**

Machines equipped with Kombi beams can be programmed to switch between standard and box tooling within a program. During operation, rotation of the Kombi beam is not automatic, but is controlled by the operator's foot pedals. The tooling indicator symbols are shown on the touchbuttons in Figure 10-20. The codes used in the cells of the column are "Std" for standard tooling and "Box" for box tooling. The default in the Tooling Type Column is always "Std".

To change a cell from one type of tooling to another, touch the cell to be changed. This brings up the Tooling Selection Pop-Up Display shown in Figure 10-20.

Select the desired tooling for the operation by touching the appropriate Tooling Touchbutton. The Pop-Up Display disappears from the machine, and the appropriate code appears in the cell in the Tooling Type Column.

If you bring up the Tooling Selection Pop-Up Display by mistake, remove it from the screen by touching its Cancel Touchbutton.

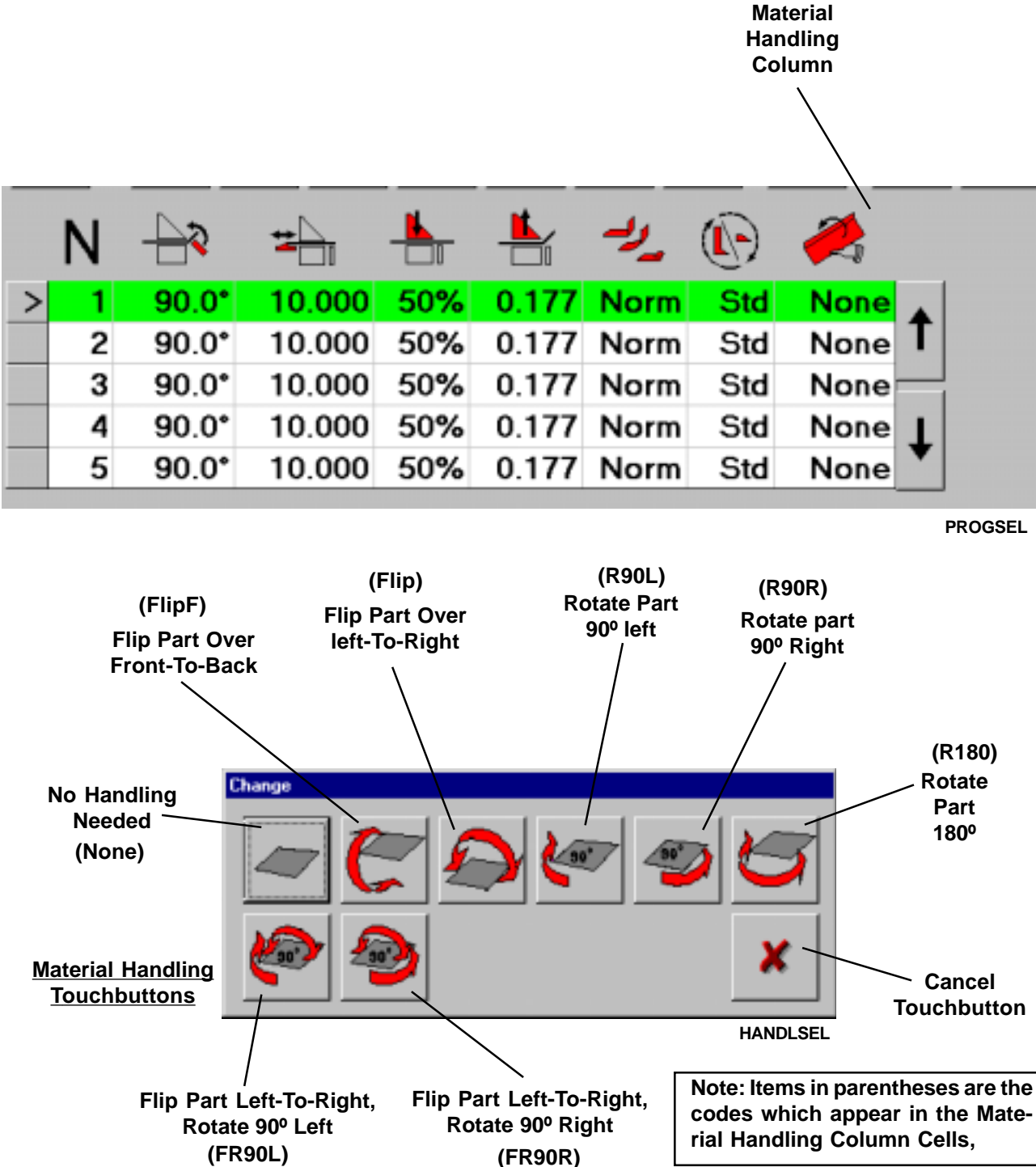


Figure 10-21. Material Handling Selection Pop-Up Display

**DEFINING
MATERIAL
HANDLING**

It is often necessary to reposition the part blank between steps during the forming process. During operation, the program tells the operator what handling action is required through the Material Handling Display on the Run/Programming Screen. Codes representing the required action also appear in the Material Handling column on the screen.

The codes are as follow (they also appear in parentheses in Figure 10-21):

None - No material handling.

FlipF - Flip part over Front-to-Back.

Flip - Flip part over Left-to-Right.

R90L - Rotate part 90° to the Left.

R90R - Rotate part 90° to the Right.

R180 - Rotate part 180°.

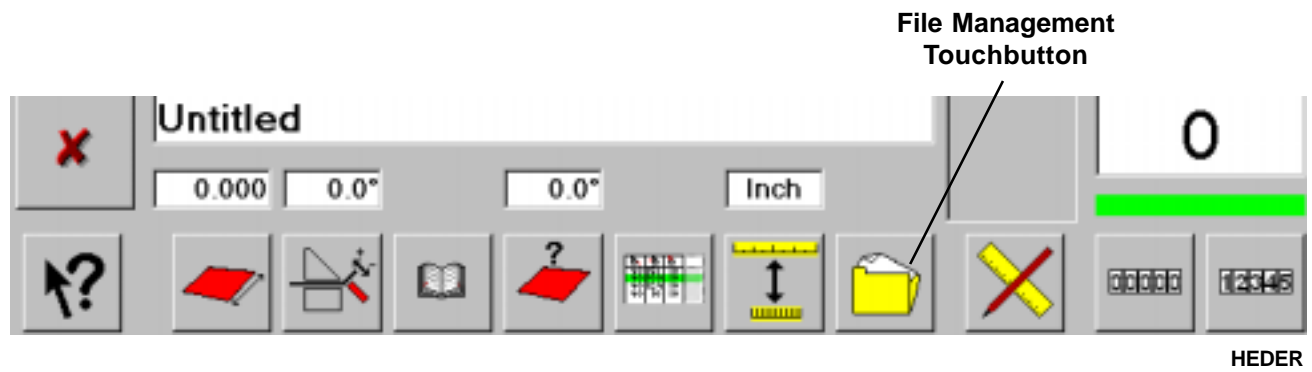
FR90L - Flip part Left-to-Right and Rotate 90° to the Left.

FR90R - Flip part Left-to-Right and Rotate 90° to the Right.

To enter the proper material handling instruction in a cell , touch the cell to be changed. This brings up the Material Handling Selection Pop-Up Display shown in Figure 10-21.

Select the desired material handling for the operation by touching the appropriate Material Handling Selection Touchbutton. The Pop-Up Display disappears from the machine, and the appropriate code appears in the cell in the Material Handling Column.

If you bring up the Material Handling Selection Pop-Up Display by mistake, remove it from the screen by touching its Cancel Touchbutton.



Save Program
Touchbutton

File Management
Pop-Up Display

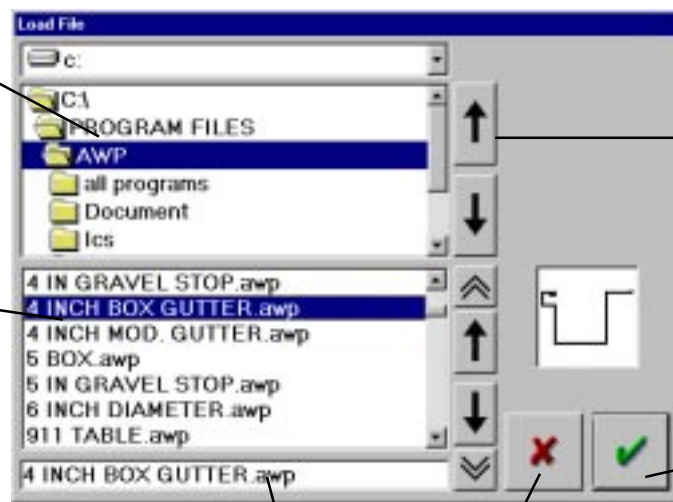


FILEMGR

File
Directory
Display

Program
Title
Display

Program
Selection
Display



Display
Scroll
Arrows

Select
Touchbutton

PROGDISP

Program
Title

Cancel
Touchbutton

Figure 10-22. Saving a Program

**SAVING A
PROGRAM**

Once a manual program has been prepared, it can be saved to the hard drive. This involves selecting the directory in which it is to be saved on the hard drive, naming the program, and then saving it to the hard drive. See Figure 10-22.

Touch the File Management Touchbutton on the Run/Programming Screen. The File Management Pop-up Display will appear.

Touch the Save Program Touchbutton on the File Management Pop-up Display. The Program Selection Display will appear. At this point the Program Title will be "Untitled"

**SELECTING
THE DIRETORY**

Select the directory in which the program is to be stored. Directory names will appear in the File Directory Display. If there are many directories, scroll through the list using the display scroll arrows until the desired directory is found. Touch the directory name to select it.

Touch the Program Title area in the Program Title Display. The Alpha-Numeric Pop-up Keypad, shown in Figure 10-23, will appear.

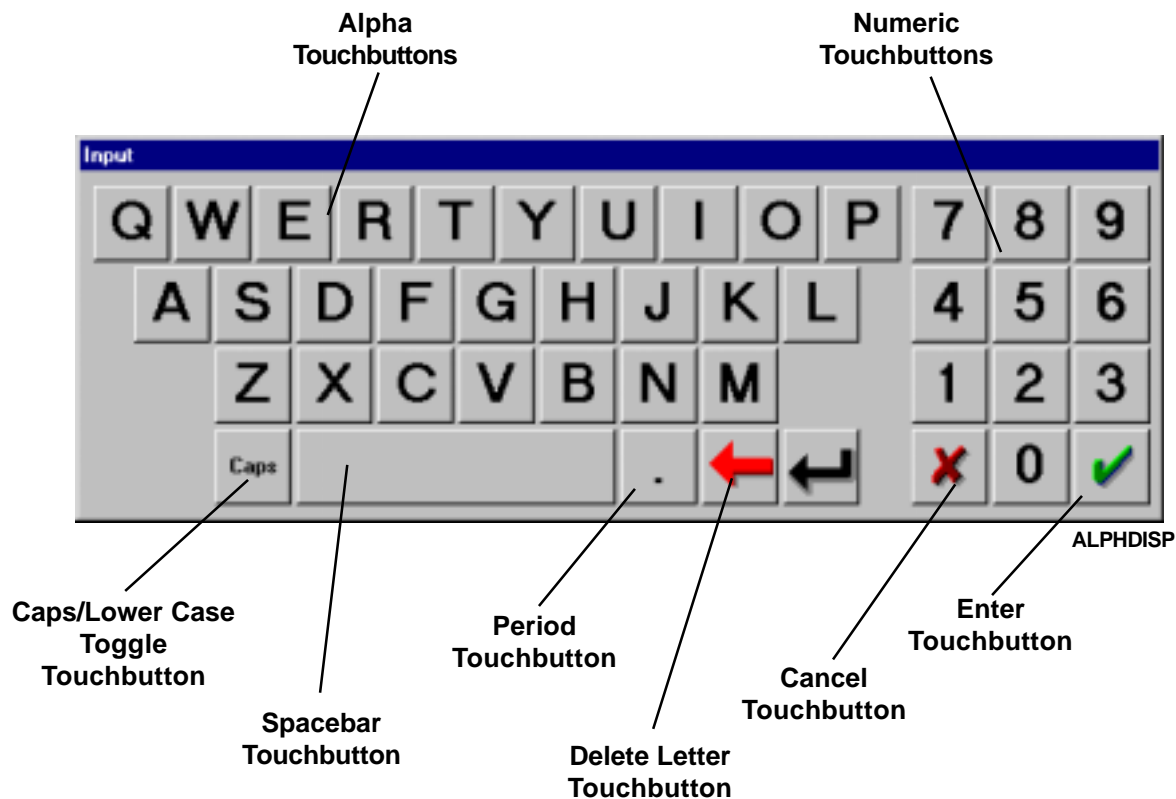


Figure 10-23. The Alpha-Numeric Pop-Up Keypad

ENTERING THE PROGRAM NAME	<p>The Alpha/Numeric Pop-Up Keypad, shown in Figure 10-23, always is used when file names are to be entered. It is always located at the bottom of the screen.</p> <p>Textual data is entered by using the Alpha Touchbuttons. Numbers are entered by using the Numeric Touchbuttons. The Period Touchbutton is used to enter a period in the text. Spaces between words are added by using the Spacebar Touchbutton. Use the Upper/Lower Case Toggle Touchbutton to change from upper to lower case and back again. When this toggle is used, it automatically changes the Alpha-Touchbuttons from one case to the other. As the data is entered, it appears in the Program Title Area of the Program Selection display.</p> <p>A character or space can be removed by touching the Delete Letter Touchbutton. When this touchbutton is used, it removes one character at a time, starting from the right.</p> <p>The entry can be cleared completely by touching the Cancel Touchbutton.</p>
COMPLETING THE SAVE FUNCTION	<p>When the entry shown is that desired, touch the Enter Touchbutton on the Program Selection display. The display disappears, leaving the File Management Pop-Up Display on the screen. Touch the Enter Touchbutton on this Display to save the new program with the .awp extension to the system hard drive. At this point, the File Management Pop-Up Display will disappear.</p>
OPTIONS	<p>It is not necessary to save the program to run it. However, if it is not saved, it will disappear when the Run/Programming Screen is closed and the machine is shut down.</p> <p>Once a program is saved, it can be run immediately from the Run/Programming Screen without being called up from the system memory.</p> <p>The system can also be shut down with no further action after the program is saved.</p>

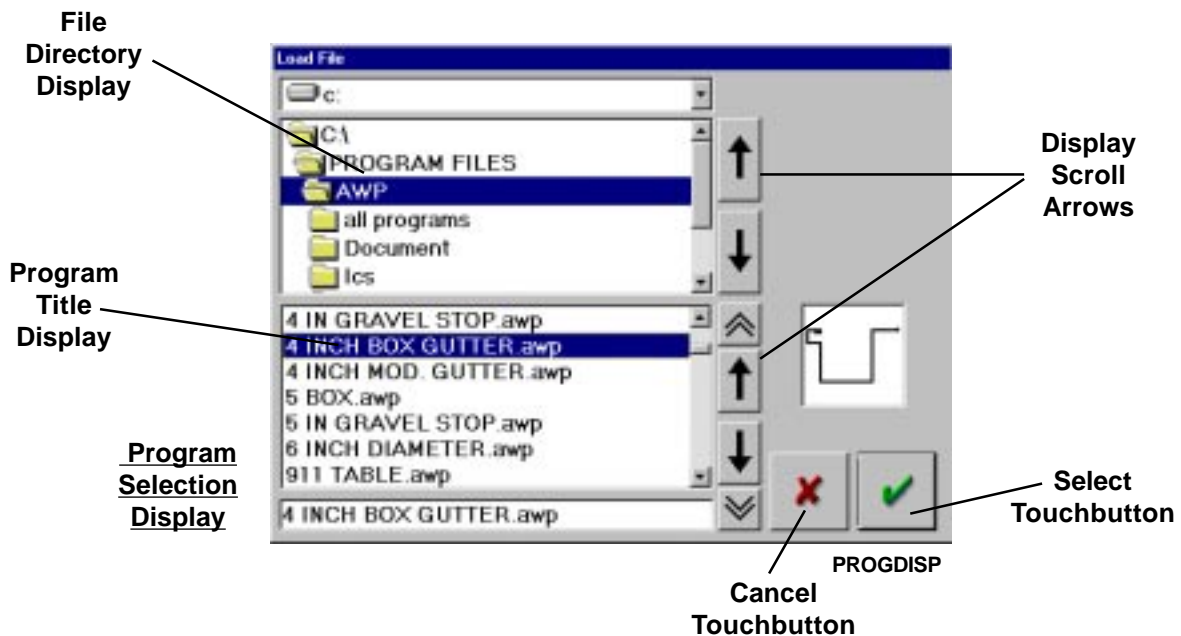
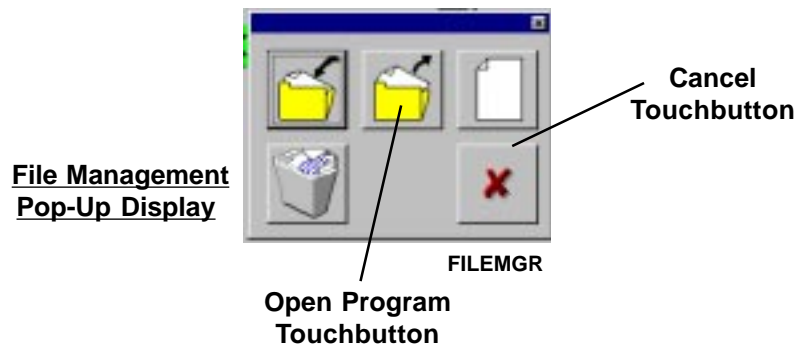
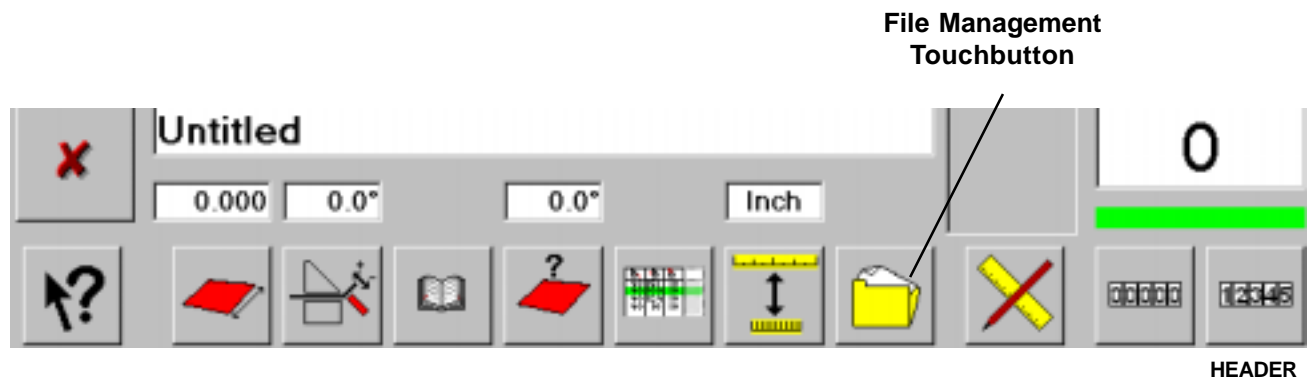


Figure 10-24. Opening a Program Prior to Modification

**MODIFYING AN
EXISTING
MANUAL
PROGRAM**

Programs prepared using manual programming procedures can easily be modified. This section describes how to make modifications to such programs. Begin the modification process by opening the program to be modified.

**OPENING A
PROGRAM**

Touch the File Management Touchbutton to bring up the File Management Pop-up Screen shown in Figure 10-22. Touch the Open Program Touchbutton to bring up the Program Selection Pop-Up Display.

**FILE
DIRECTORY
DISPLAY**

The File Directory Display shows the file structure on the computer hard drive. This is a WINDOWS-type file structure, and functions in the same way. Use the Display Scroll Arrows to move up and down within the file structure to locate the desired directory.

When the desired directory is located, touch its screen entry to highlight it in blue.

**PROGRAM
TITLE DISPLAY**

The Program Title Display shows the programs located in the highlighted directory. Programs are identified by the **.awp** extension. Use the Display Scroll Arrows to move up and down through the program names to locate the desired program.

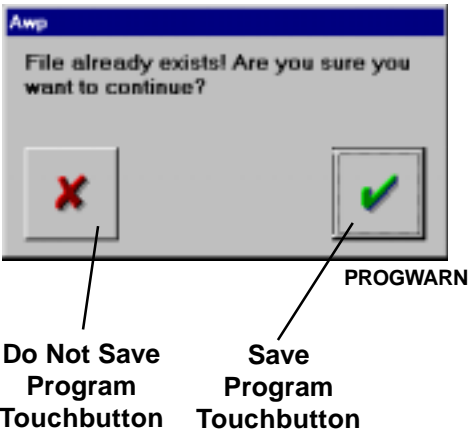
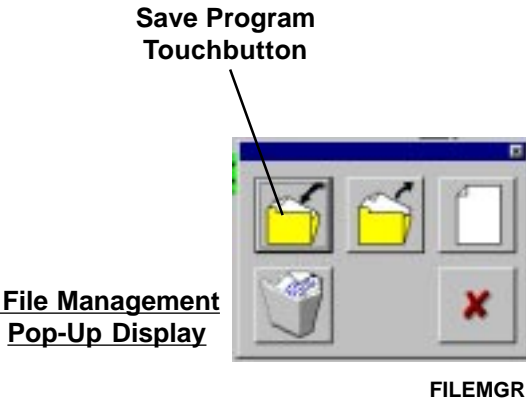
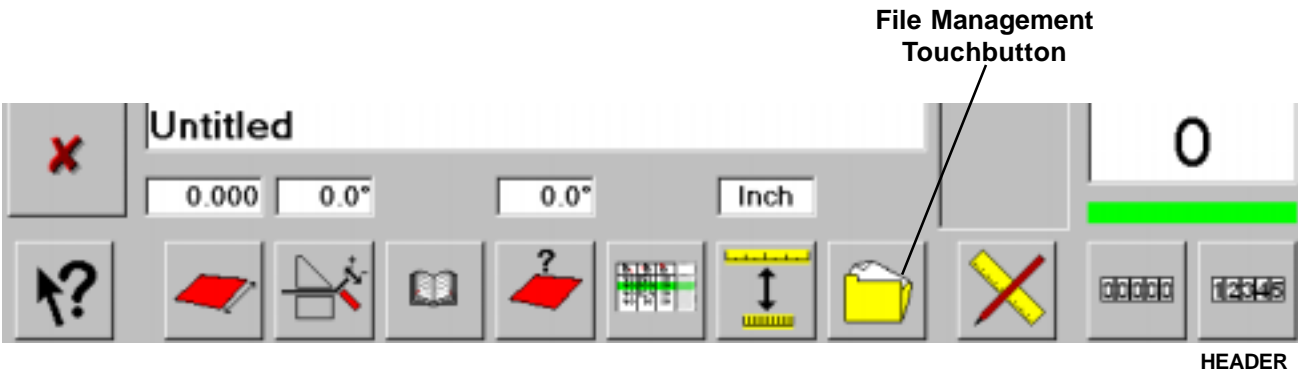
When the desired program is located, touch its screen entry to highlight it in blue.

**SELECT
TOUCHBUTTON**

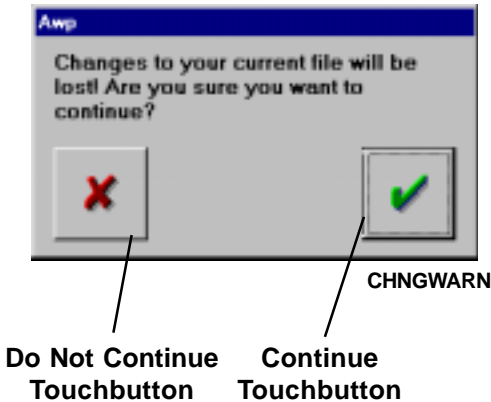
The Select Touchbutton calls up the program identified by the blue highlights. Touch it to load the program. The Run/Programming screen will reappear on the monitor.

**CANCEL
TOUCHBUTTON**

If an incorrect program has been selected, touch the Cancel Touchbutton to start over.



Existing Program Warning Display



Lost Changes Warning Display

Figure 10-25. Saving a Modified Program

SAVING A MODIFIED PROGRAM

The procedure for saving a modified program is the same as that used to save a new program. However, a modified program can also be saved as a new program with a different name.

To save a modified program with a different name, follow the procedure used to save a new program. When you arrive at the point where a name must be entered, provide a new name using the same procedure as that used to provide a name to a new program.

If you wish to save a modified program using the same name, touch the Save Touchbutton on the Program Selection Screen without changing the program name. The Existing Program Warning Display will appear. Touch the Save Program Touchbutton on this display to save the modified program.

If you touch the Do Not Save Program Touchbutton, the Warning Display disappears, and you are given the opportunity to start the save process again from the File Management Pop-up Display.

After making changes, if you try to close the program without saving it, the Lost Changes Warning Display will appear. If you do not wish to lose the changes, touch the Do Not Continue Touchbutton, and proceed with the save process. If you do not wish to save the changes, touch the Continue Touchbutton, and the changes to the program will be cancelled.

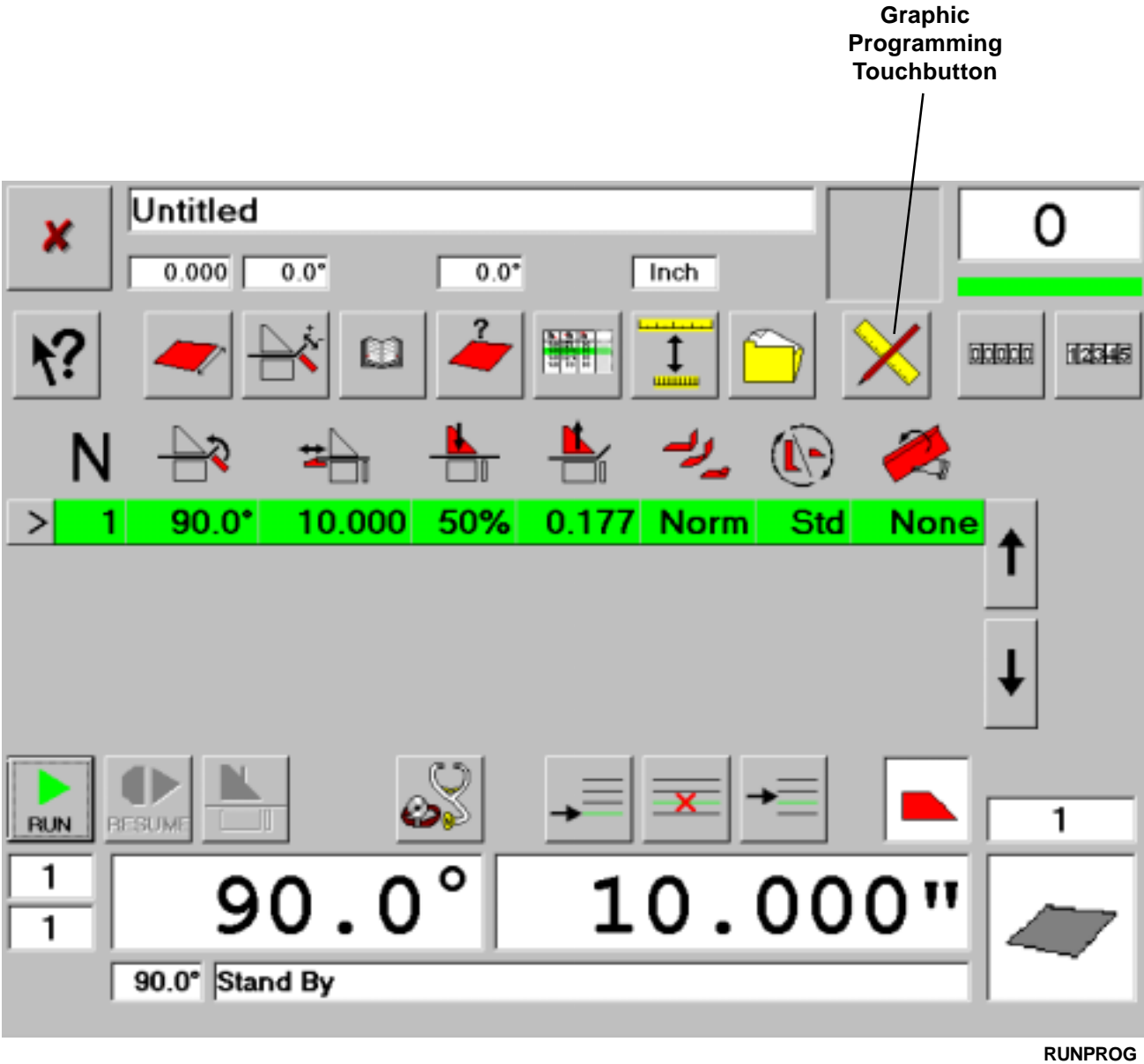


Figure 11-1. The Run/Programming Screen and the Graphic Programming Touchbutton

SECTION 11

GRAPHIC PROGRAMMING

Programs can be prepared for the Orion Control System in two ways. Graphic programming is described in this section. The other method, manual programming, is described in Section 10, Manual Programming.

In graphic programming, programs are prepared in two steps.

First, the profile of the part is drawn on the screen. Necessary dimensional data is entered at this time. Drawing proceeds from one edge of the profile to the other, which is not necessarily the order in which the bends will be made. During this part of the programming process, the system determines the blank size needed for the part.

Next, the bend order is established. During this part of the programming process, the system determines the material handling and tool change requirements.

Changes can be made to a graphic program, either during preparation, or at a later time. They must be made using graphic programming methods. Manual programming techniques will not alter programs developed by graphic programming.

GETTING STARTED

To begin graphic programming, touch the Graphic Programming Touchbutton on the Run/Programming Screen as shown in Figure 11-1. This brings up the Graphic Programming Screen shown in Figure 11-2.

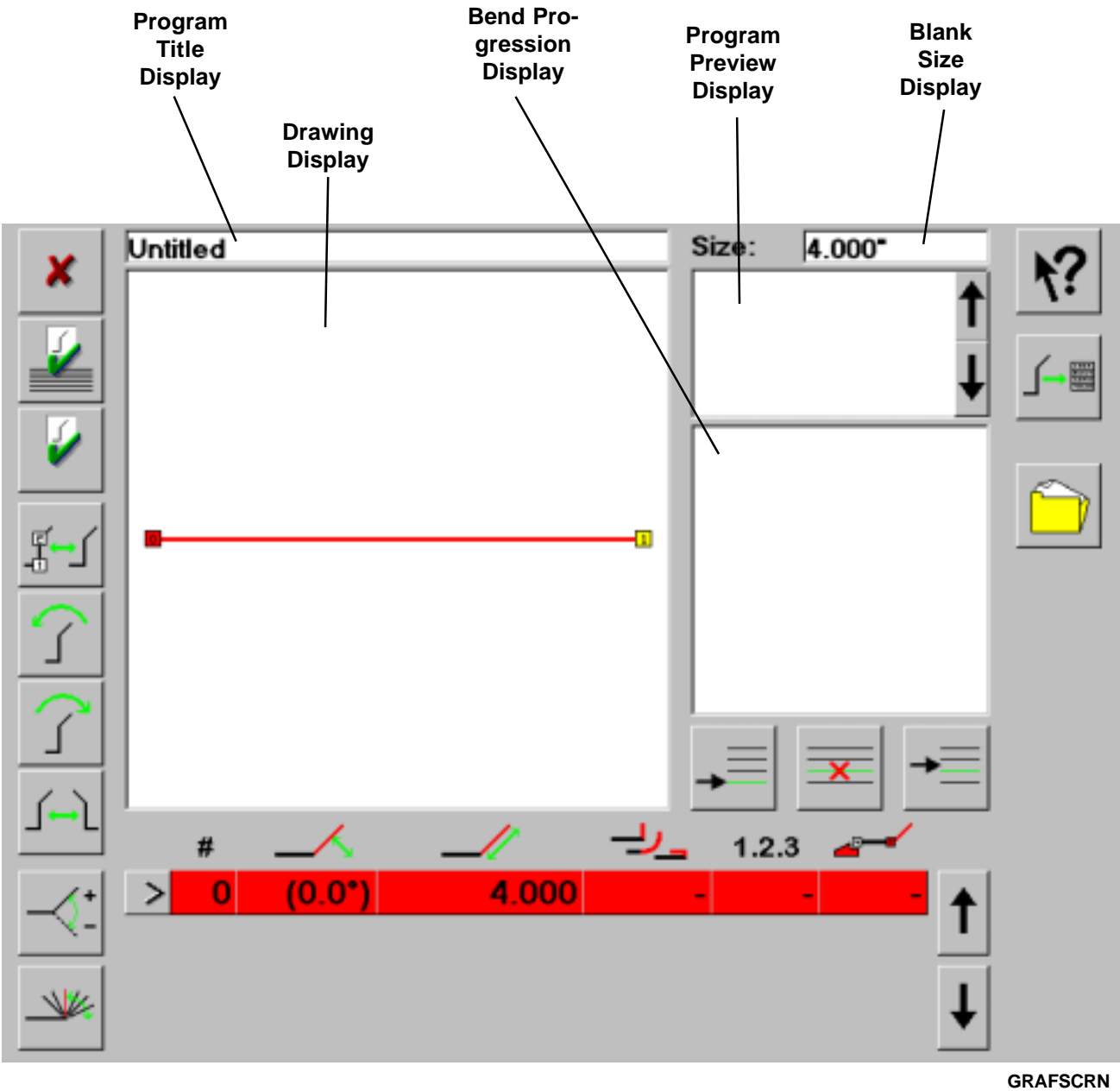


Figure 11-2. Grphic Programming Screen Showing Information Displays

INFORMATION DISPLAYS	The information displays appear as white blocks on the Graphic Programming Screen.
PROGRAM TITLE DISPLAY	The Program Title Display shows the title of the program being worked on. For new programs it reads "Untitled" until the program is named. If an existing program is being modified, it provides the program title.
DRAWING DISPLAY	The Drawing Display shows the part as it is being drawn. It defaults to a single, horizontal line in red. As part segments are added, it always shows the segment being described in red. As segments are added, it modifies its size so that the complete part profile can always be seen. The image in this display can be rotated and manipulated to help the programmer to visualize the part as it is being programmed.
BEND PROGRESSION DISPLAY	The Bend Progression Display shows each segment as it will be positioned in the machine in relation to the backgauge and the bending jaws.
PROGRAM PREVIEW DISPLAY	The ProgramPreview Display enables the programmer to review the final program before it is entered into the system memory. It provides information in an abbreviated form. Scroll Bars enable the programmer to scroll backward and forward through the program if it is too long to fit completely in the window.
BLANK SIZE DISPLAY	The Blank Size Display shows the size of the blank as the program progresses. Each time a segment is added and defined, the system calculates the blank size needed, and updates the Blank Size Display.

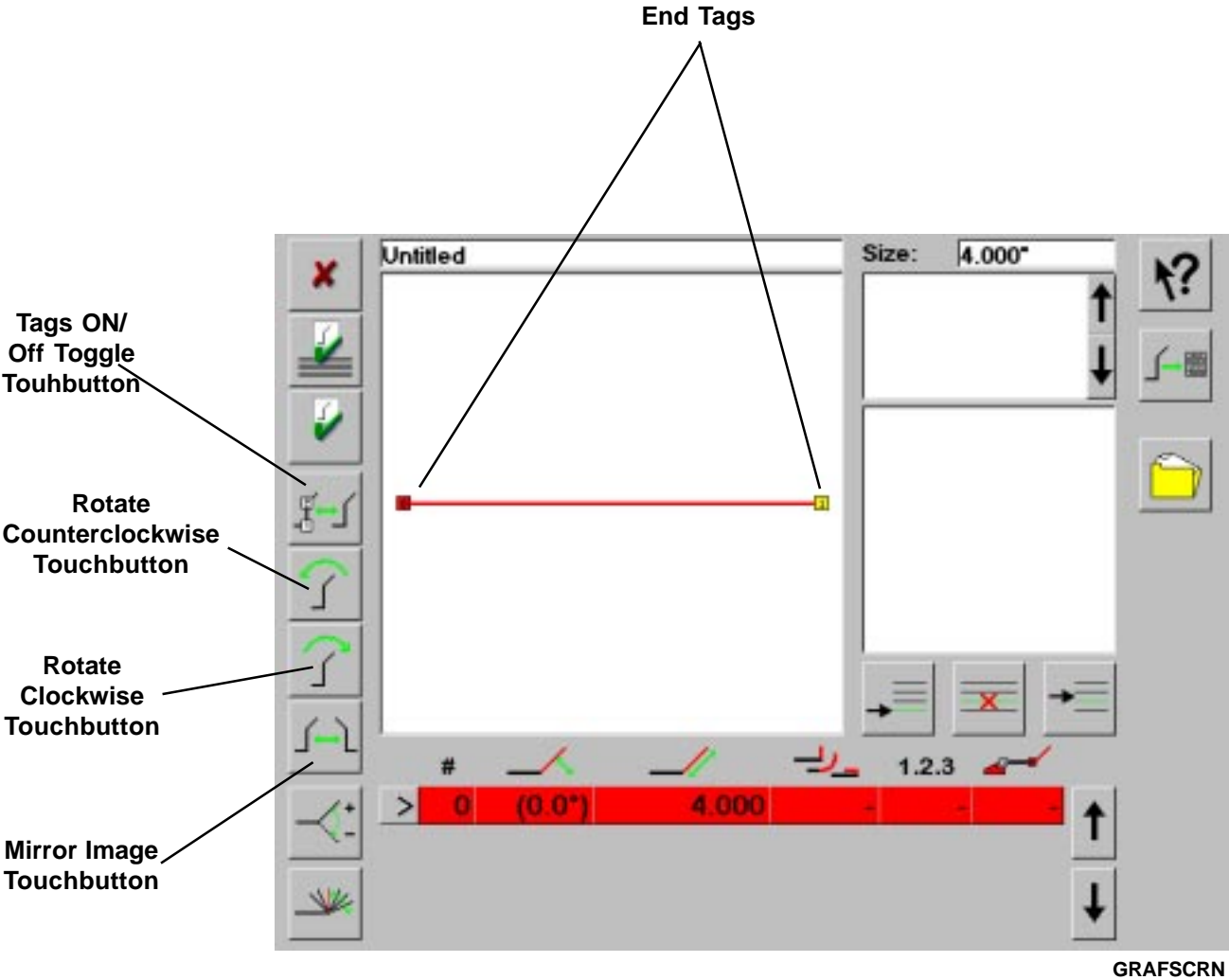


Figure 11-3. Image Control Touchbuttons

**IMAGE
CONTROL
TOUCHBUTTONS**

The image control touchbuttons exist for the convenience of the programmer. They can be used to control the part image in the Drawing Display as the programmer sees fit. They do not affect the part program in any way.

**TAGS ON/OFF
TOGGLE
TOUHBUTTON**

The End Tag On/Off Toggle Touchbutton turns the tags on and off. In most cases, the programmer will want them on, but in views with very short segments, the programmer may find it necessary to turn them off. The End Tags provide numerical identification of each end of the segment during programming.

**ROTATE
COUNTER-
CLOCKWISE
TOUCHBUTTON**

The Rotate Counterclockwise Touchbutton rotates the part view in the Drawing display 45 degrees counterclockwise (left) each time it is touched.

**ROTATE
CLOCKWISE
TOUCHBUTTON**

The Rotate Clockwise Touchbutton rotates the part view in the Drawing Display 45 degrees clockwise (right) each time it is touched.

**MIRROR
IMAGE
TOUCHBUTTON**

The Mirror Image Touchbutton “flips” the drawing from left to right when it is touched.

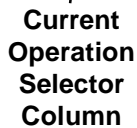


Figure 11-4. Program Definition Area of the Graphic Programming Screen

**PART
PROGRAMMING
AREA**

The Part Programming Area of the Graphic Programming Screen is located along the bottom of the screen. Each operation is defined by a row of entries across the screen. Individual details of each operation are defined in cells arranged in columns within the area. The operation rows appear in white, except for the operation being worked on, which appears in red.

**SCROLL
ARROWS**

The Scroll Arrows enable the programmer to scroll forward and backward through the program as necessary. A maximum of four operations can be seen at one time.

**CURRENT
OPERATION
SELECTOR
COLUMN**

The Current Operation Column enables the programmer to select the operation on which he wishes to work. It is normally used when selecting an operation for review. An operation can also be selected by touching a cell within the desired operation row, but this brings up an entry pop-up screen, which must be cleared before further programming can take place.

**OPERATION
NUMBER
COLUMN**

The Operation Number Column represents the order in which operations were entered. Because the entry sequence may vary from the final bend order desired, this sequence will not represent the final bend order of the program.

**BEND ANGLE
COLUMN**

The Bend Angle Column contains the programmed bend angle for each operation. The default value is "0.0 degrees", so a bend angle must be entered for each bend operation.

**SEGMENT
LENGTH
COLUMN**

The Segment Length Column contains the length of the part segment being formed by the bend. The default value is "4.000 inches" (101.6 mm), so a segment length must usually be entered.

**BEND TYPE
COLUMN**

The Bend Type Column is used to specify bends other than routine bends. It will enable the programmer to specify wing or bump radius bends, and hems.

**BEND ORDER
COLUMN**

The Bend Order Column specifies the final bend order for the program.

**PART/
BACKGAUGE
COLUMN**

The Part/Backgauge Column enables the programmer to specify the portion of the part to be located against the backgauge for each bend operation.

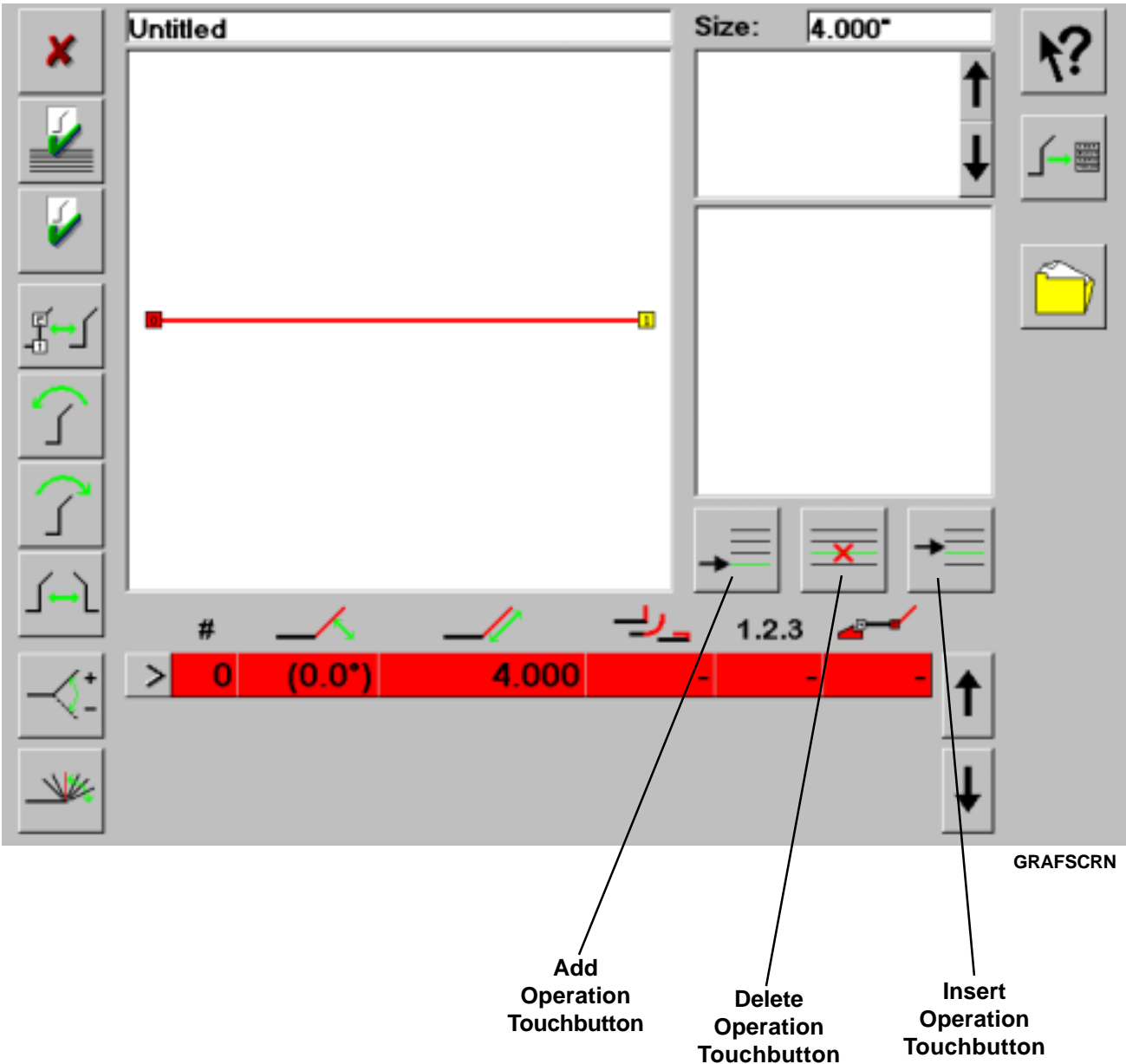


Figure 11-5. Add and Delete Touchbuttons

**ADD AND
DELETE
TOUCHBUTTONS**

Each bend operation uses a separate row in the part Programming Area (see Figure 11-4). The programmer creates new rows or deletes existing rows by touching the appropriate touchbutton.

**ADD
OPERATION
TOUCHBUTTON**

The Add Operation Touchbutton adds a new line segment and a new operation row at the end of the existing program being prepared

**INSERT
OPERATION
TOUCHBUTTON**

The Insert Operation Touchbutton adds a new operation row within the program. It always adds the row above the red highlighted row. When a new operation is inserted, the sequence numbers of the following operations are adjusted to reflect the addition.

**DELETE
OPERATION
TOUCHBUTTON**

The Delete Operation Touchbutton deletes the red highlighted operation row. When an operation is deleted, the sequence numbers of the following operations are adjusted to reflect the deletion.

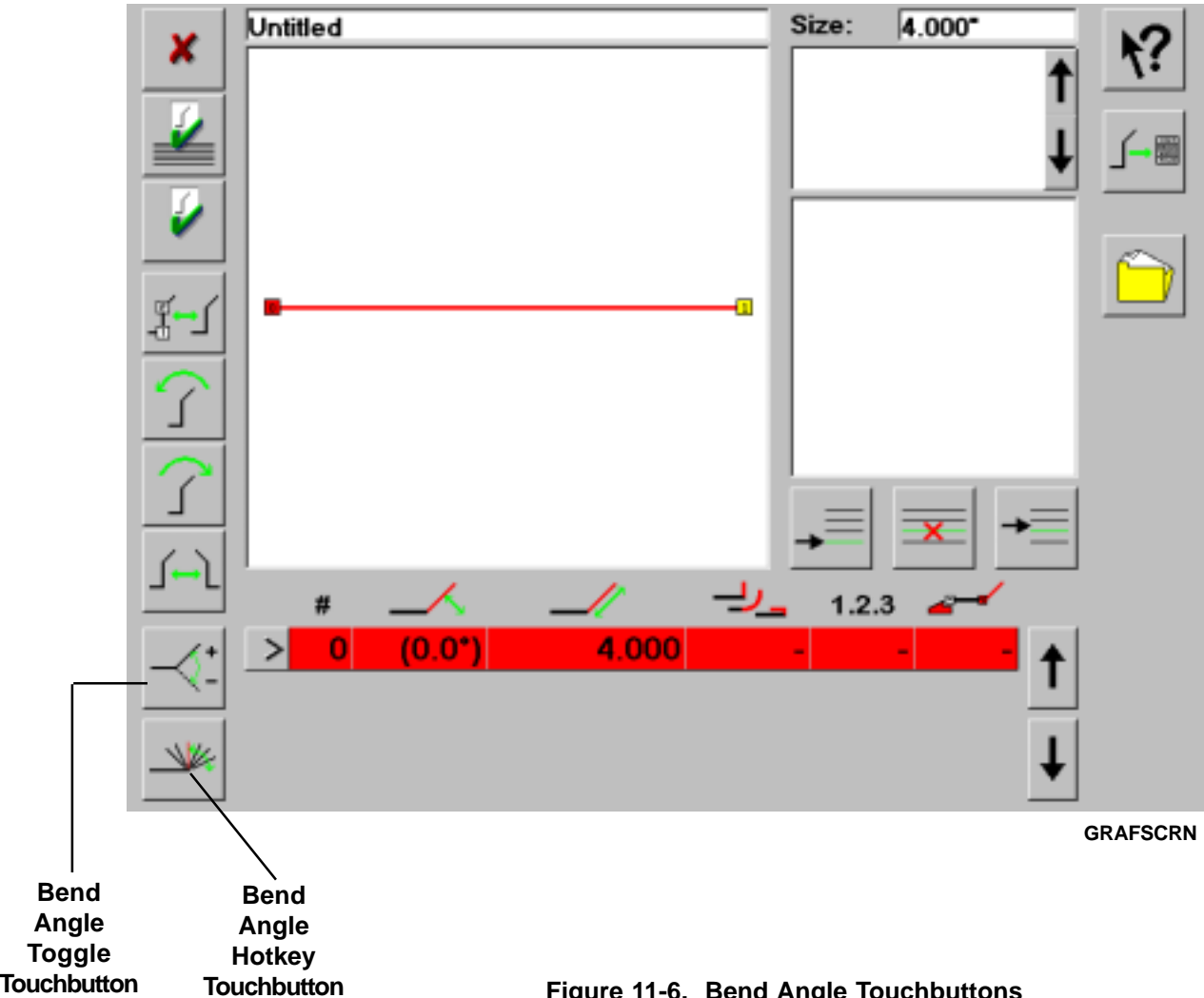


Figure 11-6. Bend Angle Touchbuttons

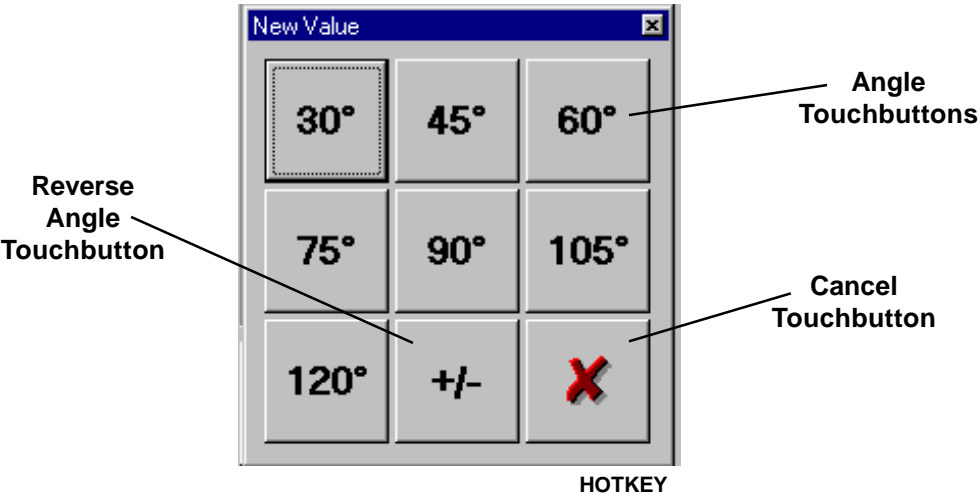


Figure 11-7. Angle Hotkey Pop-Up Display

BEND ANGLE TOUCHBUTTONS The Bend Angle Touchbuttons are used to enter bend angles during the programming process.

BEND ANGLE TOGGLE TOUCHBUTTON The Bend Angle Toggle Touchbutton reverses the direction of bend. When an angle is entered, it is always displayed as a “counterclockwise” (to the left) bend. If the bend is to be in the opposite direction, touching the Bend Angle Toggle Touchbutton will change it to the opposite direction. Angles can be changed to the opposite direction at any time. When used in Operation “0”, it rotates the default line 45° counterclockwise.

BEND ANGLE HOTKEY TOUCHBUTTON The Bend Angle Hotkey Touchbutton calls up the Bend Angle Hotkey Pop-Up Display shown in Figure 10-7. This display enables the programmer to enter common angles quickly. When applied to operations in the Bend Angle Column, it replaces the default value (0.0) from the cell to which it is applied.

ANGLE TOUCHBUTTONS The Angle Touchbuttons provide seven common angles. When a touchbutton is touched, it enters that angle into the cell in the operation line, and the Pop-Up Display disappears from the screen. Other bend angles are entered using the Numeric Pop-Up Keypad shown in Figure 11-9.

REVERSE ANGLE TOUCHBUTTON The Reverse Angle Touchbutton is touched before touching an Angle Touchbutton to reverse the default (counterclockwise) bend angle. When touched, it changes all the bend angle Touchbuttons to minus values, and the entered angle will be clockwise.

CANCEL TOUCHBUTTON The Cancel Touchbutton removes the Pop-Up Display from the screen without entering a bend angle in the Bend Angle Column.

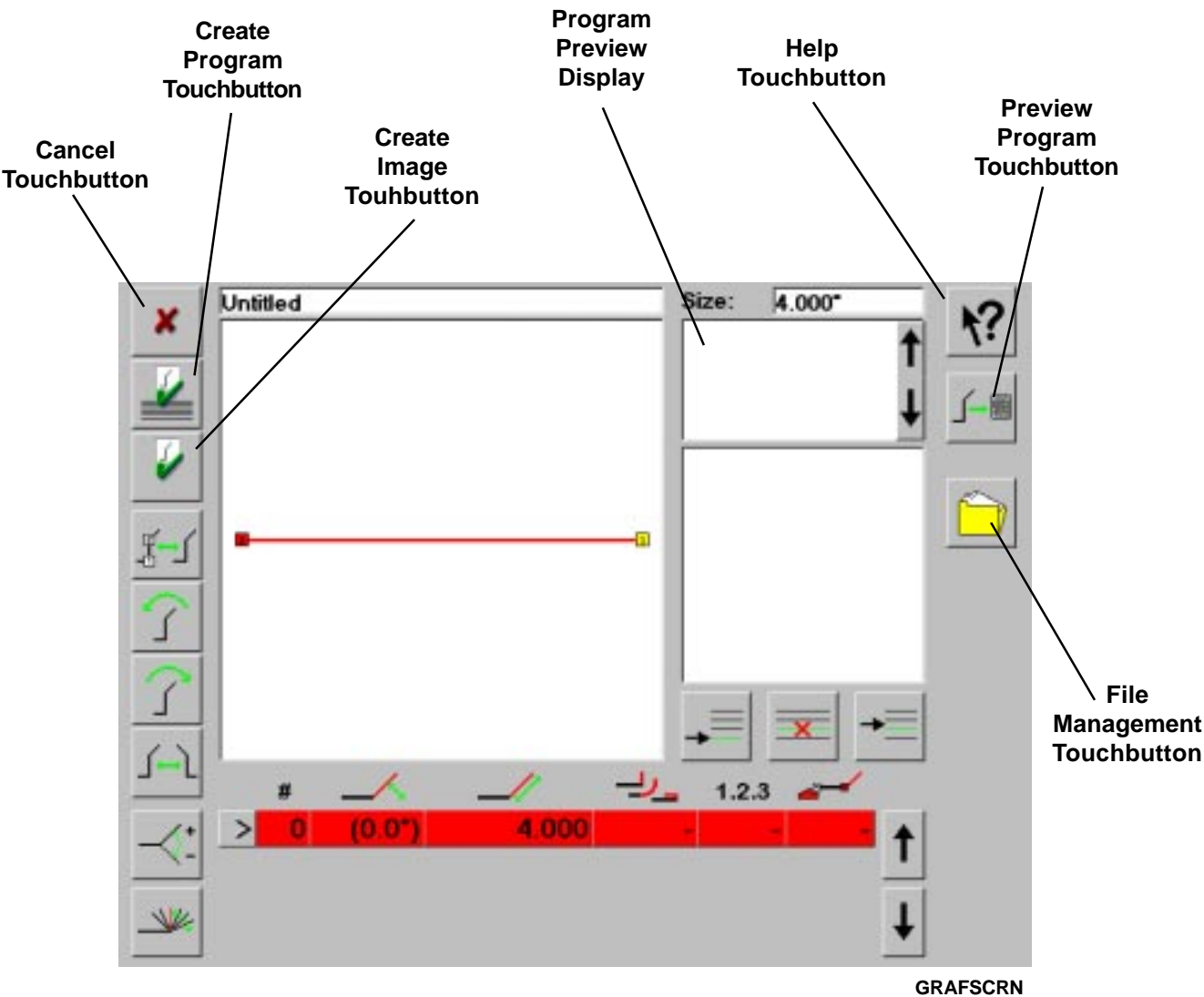


Figure 11-8. Remaining Graphic Programming Screen Touchbuttons

**HELP
TOUCHBUTTON**

The Help Touchbutton is used to provide an explanation of the various touchbuttons on the screen. When the Help Touchbutton is pressed a question mark appears after the cursor arrow. Press the touchbutton for which an explanation is desired. A box explaining the function of the touchbutton will appear.

To get an explanation for another touchbutton, repeat the process. The Help Touchbutton must be touched each time an explanation is needed.

**PREPARING
TO SAVE THE
PROGRAM**

Several Touchbuttons enable the programmer to prepare for saving the program.

**PREVIEW
PROGRAM
TOUCHBUTTON**

The Program Preview Touchbutton causes the program to appear, in abbreviated form, in the Program Preview Display. The programmer may then scroll through the program while checking it for correctness.

**CREATE
IMAGE
TOUCHBUTTON**

The Create Image Touchbutton is used to create an image for an already existing program. See Figure 11-24 for further information.

**CREATE
PROGRAM
TOUCHBUTTON**

The Create Program Touchbutton is used to create the graphic program from the image which has been drawn. At this point, the Graphic Programming Screen disappears, and the Run/Programming Screen appears, complete with the information available from the creation of the program.

The programmer must then complete the program, entering tooling data, angle compensation data, and any other required data. This data is entered using manual programming techniques.

**FILE
MANAGEMENT
TOUCHBUTTON**

The program must also be named and saved as directed in Section 12, File Management.

**CANCEL
TOUCHBUTTON**

The Cancel Touchbutton removes the Graphic Programming Screen and replaces it with the Run/Programming Screen without creating or saving a graphic image.

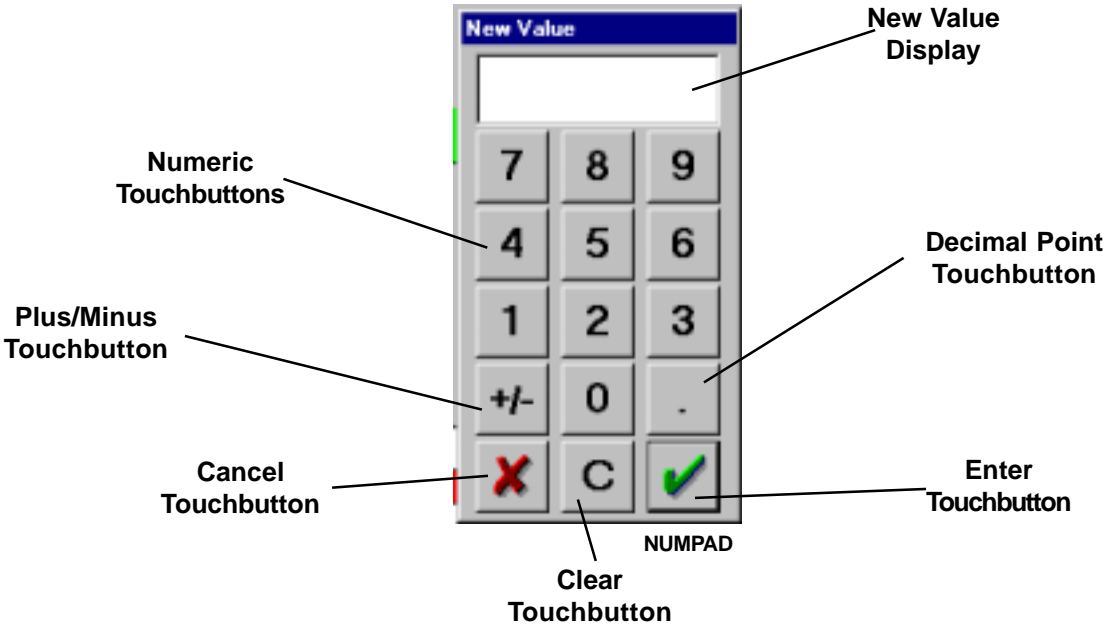


Figure 11-9. The Numeric Pop-Up Keypad

**ENTERING
PROGRAMMING
DATA**

The Numeric Pop-Up Keypad, shown in Figure 11-9, always appears when numeric data must be entered. It is always located at the extreme right-hand side of the screen.

Numeric data is entered by using the Numeric Touchbuttons. As the data is entered, it appears in the New Value Display at the top of the keypad. A decimal point is entered by using the Decimal Point Touchbutton.

Numeric values can be made positive or negative by using the Plus/Minus Touchbutton, which can be used at the beginning of an entry, or at any point after numeric data is entered. The system will convert any negative values to positive in any instance where negative values are not allowed.

A numeral can be removed from the New Value Display by touching the Clear Touchbutton. When this touchbutton is used, it removes one number at a time, starting from the right.

The New Value Display can be cleared completely by touching the Cancel Touchbutton.

When the value shown in the New Value Display is the value desired, the Enter Touchbutton is used to enter it into the program. The value in the New Value Display then moves to the appropriate display, and the Numeric Pop-Up Keypad disappears from the screen.

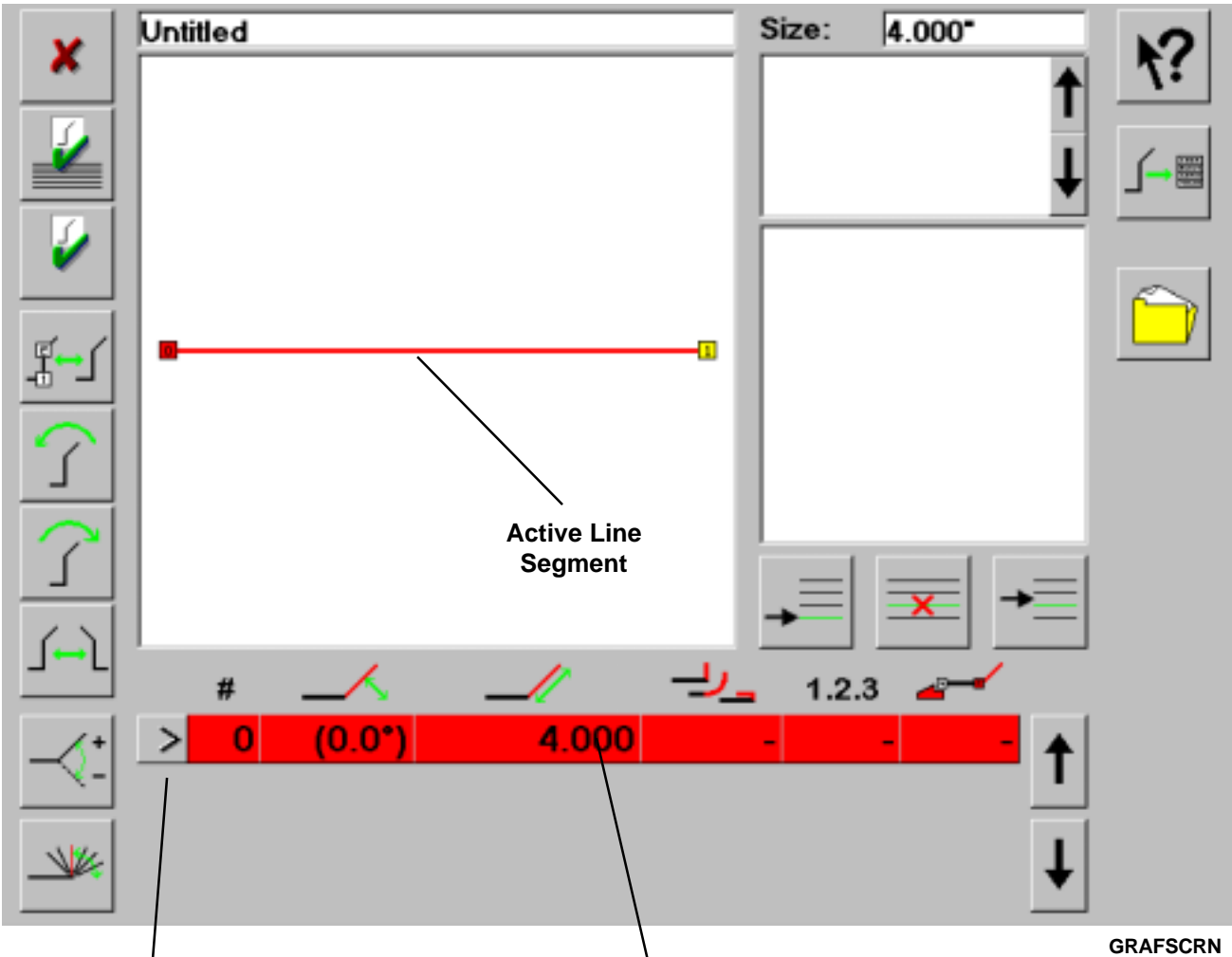


Figure 11-10. Programming Line Segments

**PROGRAMMING
LINE
SEGMENTS**

Line segments represent the portions of the part between bends. Whenever a normal bend operation is added, a new line segment is added beyond the bend, with a default length. The actual required length dimension must be substituted for this default length.

When the Graphic Programming Screen appears for a new program, a line segment is shown in red, and the operation number is designated as "0". This is not a bend operation. This segment length must be defined before the first bend angle (Operation 1) is entered. Entering a bend angle at this point rotates the initial line segment.

Touch the cell immediately below the line segment symbol. The Numeric Keypad Pop-Up Display (Figure 11-9) appears. Enter the line segment dimension on the keypad, and transfer it to the segment length cell by pressing the Enter Touchbutton.

As additional bend operations are added to the program, each contains a segment length cell, which is modified from the default in the same way.

**SELECTING
THE ACTIVE
LINE SEGMENT**

From time to time it may be necessary to modify the segment length of a previously defined segment. In order to do so, you must make that line segment active. Use one of two methods to do so. Either touch the desired line, or touch the block in the Current Operation Selector Column in front of the line operation line representing the desired segment. The selected segment will change to red.

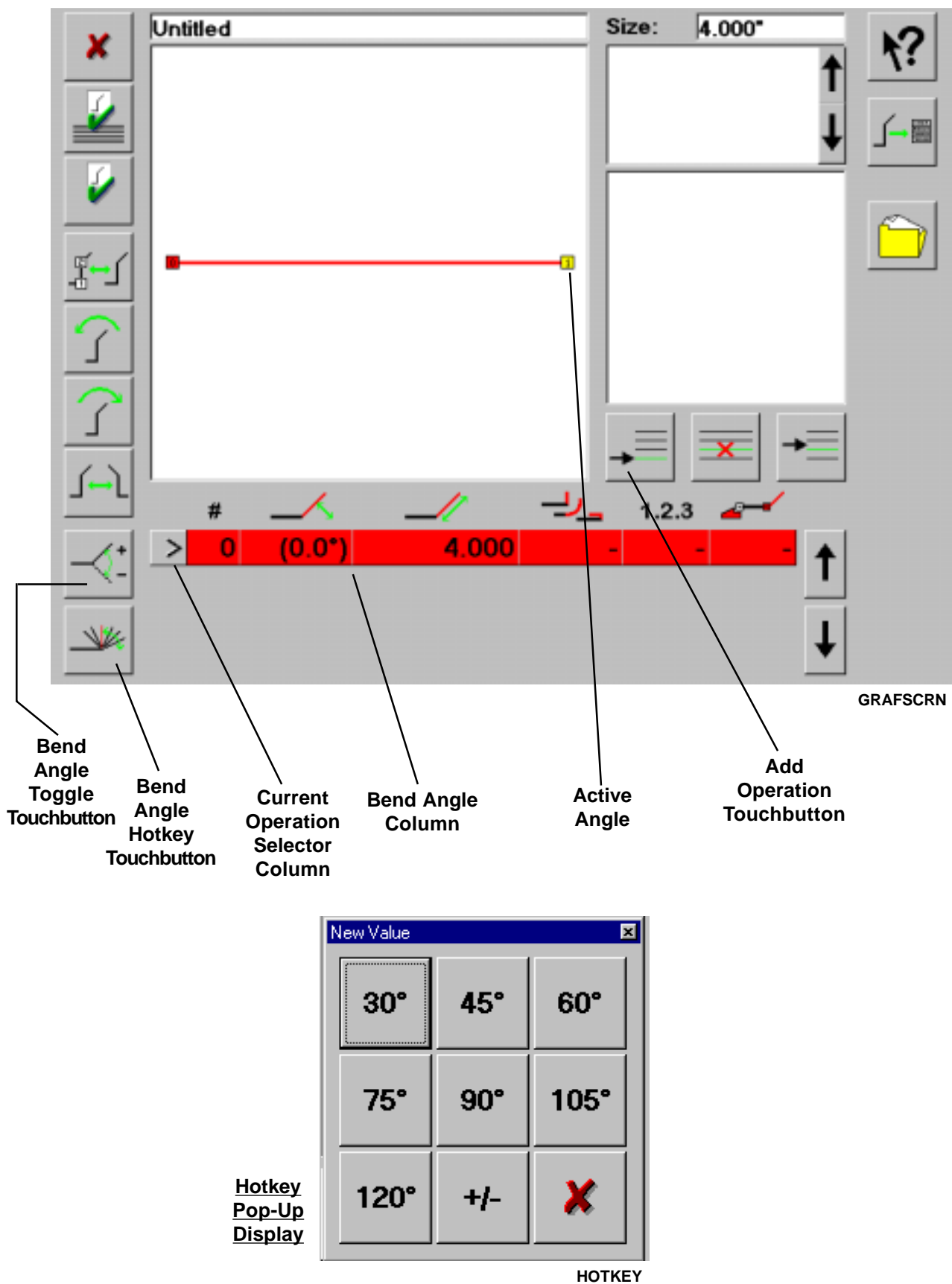


Figure 11-11. Programming Bend Angles

PROGRAMMING ANGLES

When the Graphic Programming Screen appears for a new program, a line segment is shown in red, and the operation number is designated as "0". This segment length must be defined before the first bend angle (Operation 1) is entered. Entering a bend angle at this point merely rotates the initial line segment.

Enter a new operation in the program by touching the Add Operation Touchbutton. A new line segment appears on the screen. The angle at the beginning of the new line segment is the active angle.

USING THE HOTKEY TOUCHBUTTON

Common angular values can be added in one of two ways. If the angle is a common angle, its value can be entered using the Bend Angle Hotkey Touchbutton (see Figure 11-11). Common bend angles entered from this touchbutton are:

30° 45° 60° 75° 90° 105° 120°

These angles are always counterclockwise (to the left). If an angle must be clockwise (to the right), touch the "+/-" Touchbutton to change it.

ENTERING OTHER ANGLES

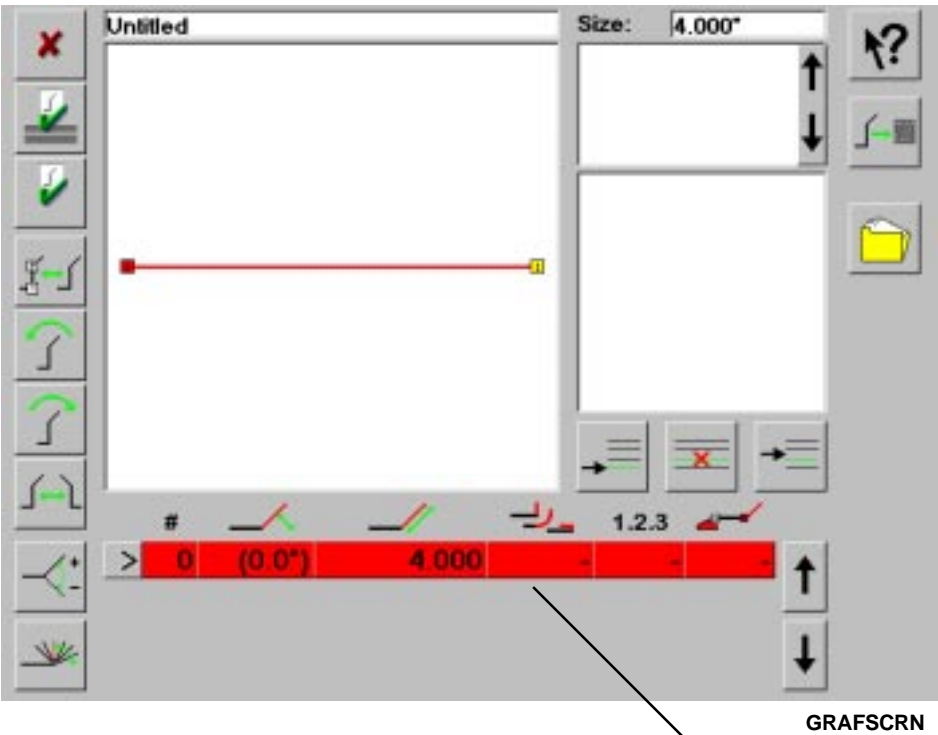
Other angles can be added by using the Numeric Keypad Pop-Up Display (see Figure 11-9). Touch the cell immediately below the line segment symbol. The Pop-Up Display appears. Enter the angle dimension on the keypad, and transfer it to the bend angle cell by pressing the Enter Touchbutton. Angles can be entered in tenths of a degree.

Angles entered from the Pop-Up Display are always counterclockwise (to the left). If the angle must be clockwise (to the right), touch the Bend Angle Toggle Touchbutton to change it.

As additional bend operations are added to the program, each contains a bend angle cell, which is entered in the same way.

SELECTING THE ACTIVE ANGLE

From time to time it may be necessary to modify the bend angle of a previously defined bend. In order to do so, you must make that angle active. Use one of two methods to do so. Either touch the desired angle, or touch the block in the Current Operation Selector Column in front of the line operation line representing the desired angle. The selected angle tag will change to red.



Bend Type
Touchbutton

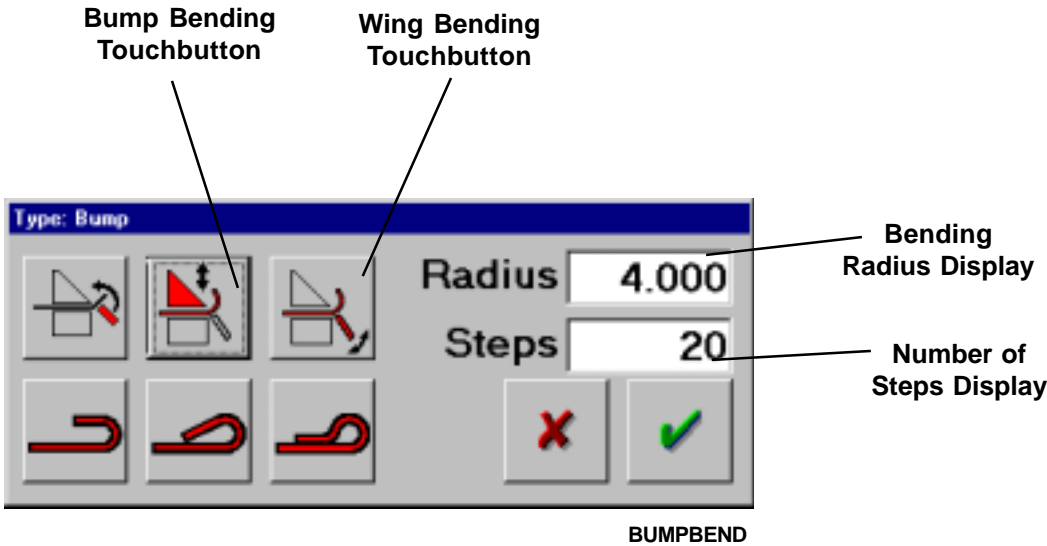


Figure 11-12. Programming a Radius Bend

**PROGRAMMING
A RADIUS
BEND**

In radius bending, the material is formed in a series of steps, each being a fraction of the total programmed bend. Both the desired radius and the desired number of steps must be entered into the bend type selection. When the Display for either value is touched, the Numeric Pop-Up Keypad (Figure 11-9) appears. Enter the numeric value desired (the minimum number of steps for a radius bend is "3"), touch the Enter Touchbutton of the keypad to transfer the value to the Bend Display, repeat the entry steps for the second value, and touch the Enter Touchbutton for the Selection Pop-Up to transfer the data to the program.

The Orion control calculates any required bending beam and backgauge movements from the settings entered above. Additional angle compensation may be required to form the desired radius. Adding specific compensation only for the radius bending operation is recommended when compensating for springback in the work material.

The programmed arc of the radius bend is shown in the large display, and the bend angle increment for each step is shown in the small display.

**BUMP
BENDING**

In Bump Bending, the bend pedal is pressed to begin, and the bending beam rotates to its programmed position. Thereafter, the bending beam remains locked in this position. The clamp pedal is pressed and the upper beam clamps the material, making the first bend step of the radius. The upper beam unclamps automatically and the backgauge automatically feeds the material toward the operator. Then the upper beam reclamps, forming the second step of the bend, and the process repeats itself until the radius is completely formed. (If the clamp pedal is held down, the cycle is automatic, as described. If the clamp pedal is released, it must be depressed again to continue the cycle.) During this process it is necessary for the operator to hold the workpiece firmly against the backgauge because bending takes place during the clamping downstroke, when the material is free to move about.

**WING
BENDING**

In Wing Bending, the upper beam is clamped against the work material before each incremental step of the radius is formed. The bend pedal is then pressed, and the bending beam rotates to the incremental bend position. The process is repeated for each incremental bend until the radius is complete.

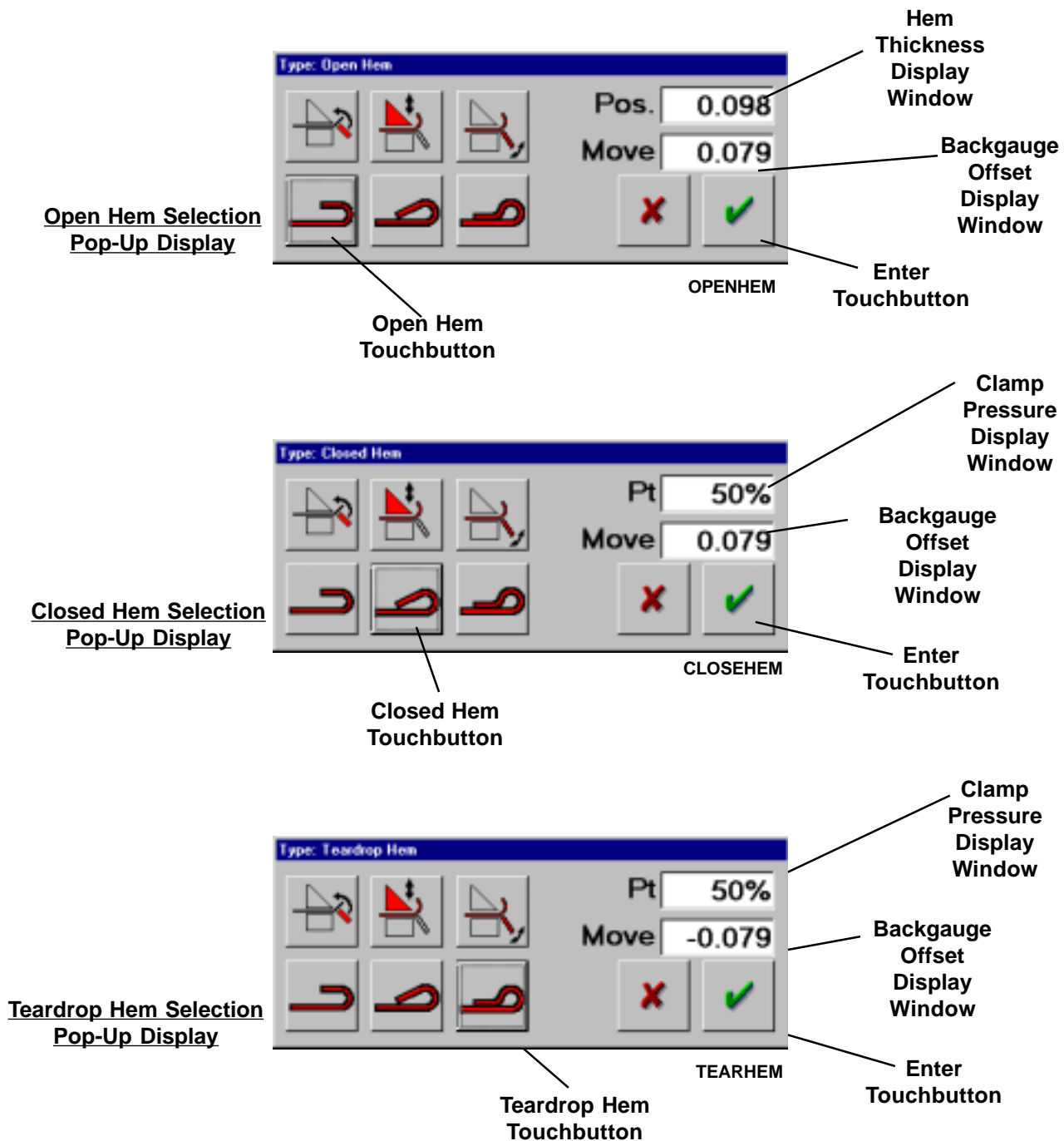


Figure 11-14. Hem Bending

HEM BENDING	<p>Forming a hem is a two-step process. The part is pre-bent to the maximum angle possible. The flange being formed is then placed under the upper jaw, and the clamp jaws are closed to form the hem.</p> <p>The backgauge offset positions the part so that the upper jaws clamp properly on the flange. Offset will vary depending on the size of the flange, and the hem being formed. The thickness and strength of the material may cause hems to be formed more at the end of the flange. Varying the backgauge offset allows some compensation for this.</p>
OPEN HEMS	<p>When an open hem is formed, the flange is bent until it is parallel to the adjacent material, but it is not flattened against the material. The hem is defined by its thickness, measured across the outside of the hem. The upper beam will use up to the maximum clamping power available to reach the desired configuration for the hem because no pressure is given.</p>
CLOSED HEMS	<p>Closed hems are formed by clamping on the edge of the hem. When a closed hem is formed, the material is bent back upon itself so that the edge of the flange touches the material. The hem is influenced by the backgauge offset, which governs clamping position, and the pressure needed to bring the flange edge against the material. When forming thin materials use a pressure appropriate for the material; better results can often be achieved by lowering the pressure.</p>
TEARDROP HEMS	<p>Teardrop hems are formed by clamping behind the edge of the hem. This flattens the edge of the hem against the material. This type of hem requires less pressure than that needed to for a closed hem. Therefore, thicker materials may be closed in a teardrop hem as compared to a closed hem. Also, if short flanges are used in the forming of the hem, bending a teardrop hem may yield more consistent results. When forming thin materials use a pressure appropriate for the material; better results can often be achieved by lowering the pressure.</p>

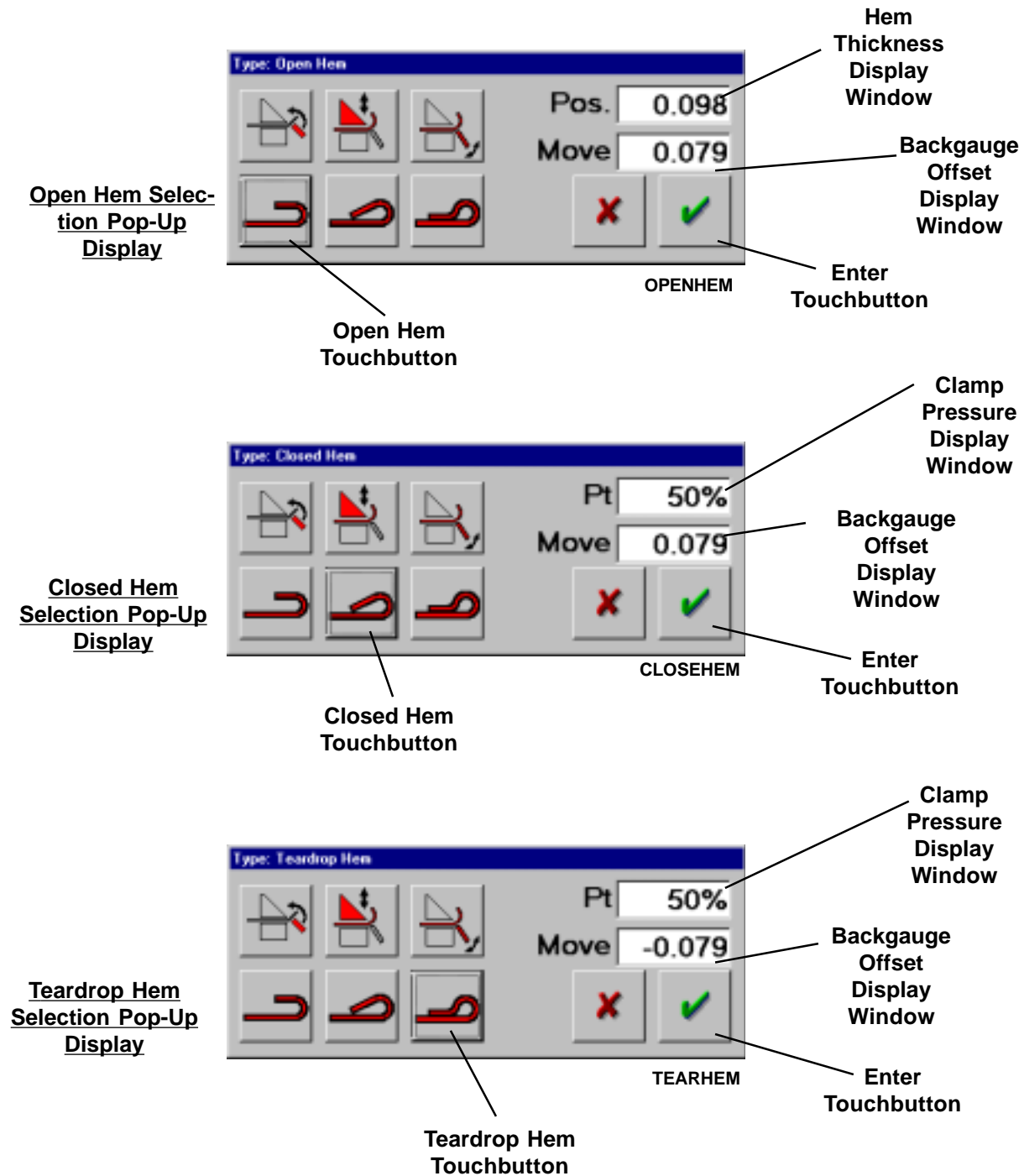


Figure 11-13. Hem Bending (continued)

ENTERING HEM DATA	<p>Pressing a Hem Selection Touchbutton opens two display windows in the appropriate Selection Pop-Up Display, shown in Figure 11-14. To enter a value other than the default value shown, touch the display window which must be changed.</p> <p>The Numeric Pop-Up Keypad (Figure 11-9) appears. Enter the appropriate data using the keypad, and then touch the Numeric Keypad Enter Touchbutton to transfer the value to the Display Window. The Numeric keypad will close. Repeat for the second Display Window.</p> <p>When the Display Windows contain the correct data, touch the Enter Touchbutton to enter the data into the program. The Selection Display will disappear, and the appropriate code will appear in the cell of the Bend Type Column.</p>
OPEN HEM BENDING	<p>When Open Hem is selected as the bend type, the Bend Angle Column changes to show the maximum angle allowed in the Machine Parameters. In addition to the backgauge offset position (bottom window), the hem dimension across the outside of the material at the hem (top window) must be entered.</p> <p>When the hem data is entered into the program, the code "OHem" appears in the cell in the Bend Type Column.</p>
CLOSED HEM BENDING	<p>When Closed Hem is selected as the bend type, the Bend Angle Column changes to show the maximum angle allowed in the Machine Parameters. In addition to the backgauge offset position (bottom window), the hem pressure to be used to close the hem (top window) must be entered.</p> <p>When the hem data is entered into the program, the code "CHem" appears in the cell in the Bend Type Column.</p>
TEARDROP HEM BENDING	<p>When Teardrop Hem is selected as the bend type, the Bend Angle Column changes to show the maximum angle allowed in the Machine Parameters. The backgauge offset position (bottom window) will always be negative; if you enter a positive number, the machine will convert it to a negative number. The hem pressure to be used to close the hem (top window) must also be entered.</p> <p>When the hem data is entered into the program, the code "THem" appears in the cell in the Bend Type Column.</p>

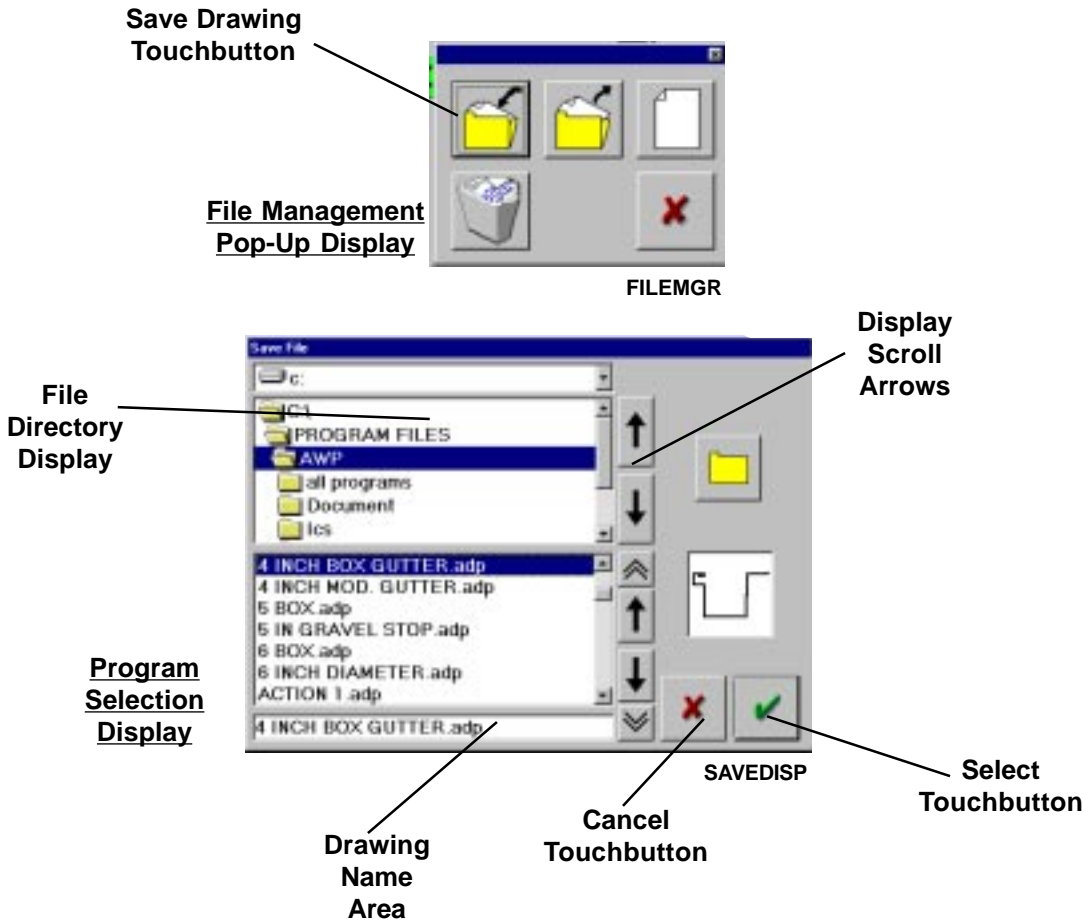
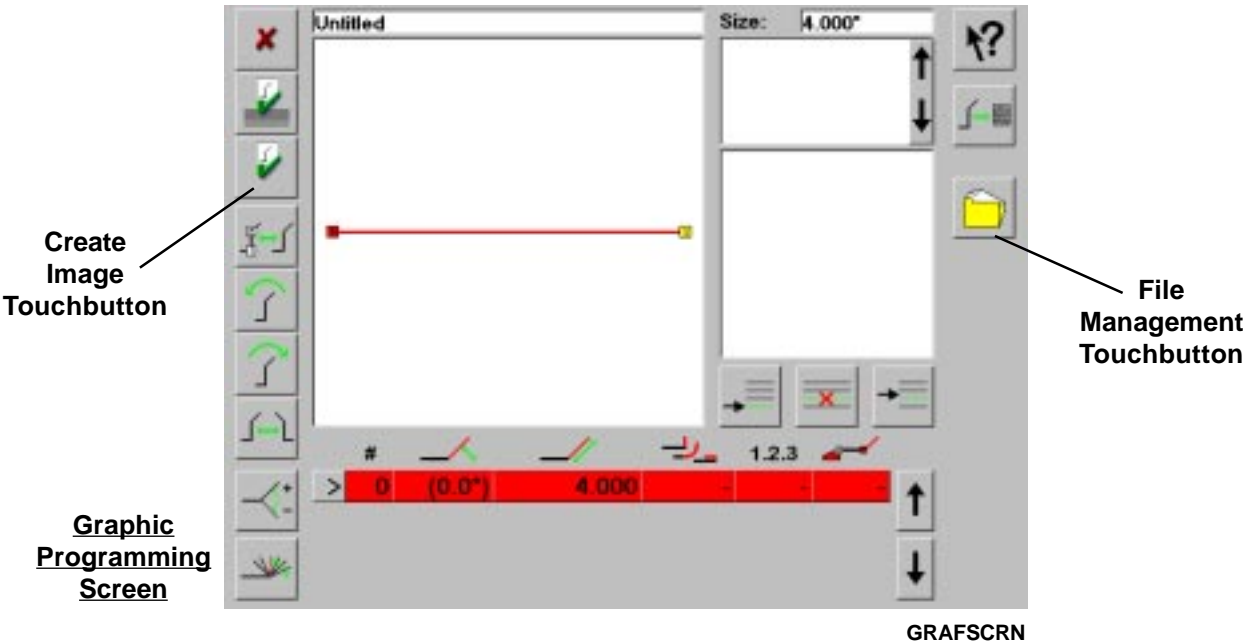


Figure 11-14. Saving a Drawing

SAVING A DRAWING

Drawings may be saved under several circumstances. They may be saved when incomplete, and worked on at a later time. They may be saved when complete without using them to produce a program. A completed drawing may later be attached to a manual program, or it may be used to produce a new program.

Drawings can be identified within the directory in which they are saved by the **.adp** extension after the drawing name.

Begin the save procedure by touching the File Management Touchbutton on the Graphic Programming Screen. This will bring up the File Management Pop-Up Display

Touch the Save Drawing Touchbutton. This will bring up the Program Selection Display.

Select the directory in which the drawing is to be stored. Directory names will appear in the File Directory Display. If there are many directories, scroll through the list using the display scroll arrows until the desired directory is found. Touch the directory name to select it.

Touch the Drawing Name Area. This will bring up the Alpha-Numeric Pop-up Keypad shown in Figure 11-15.

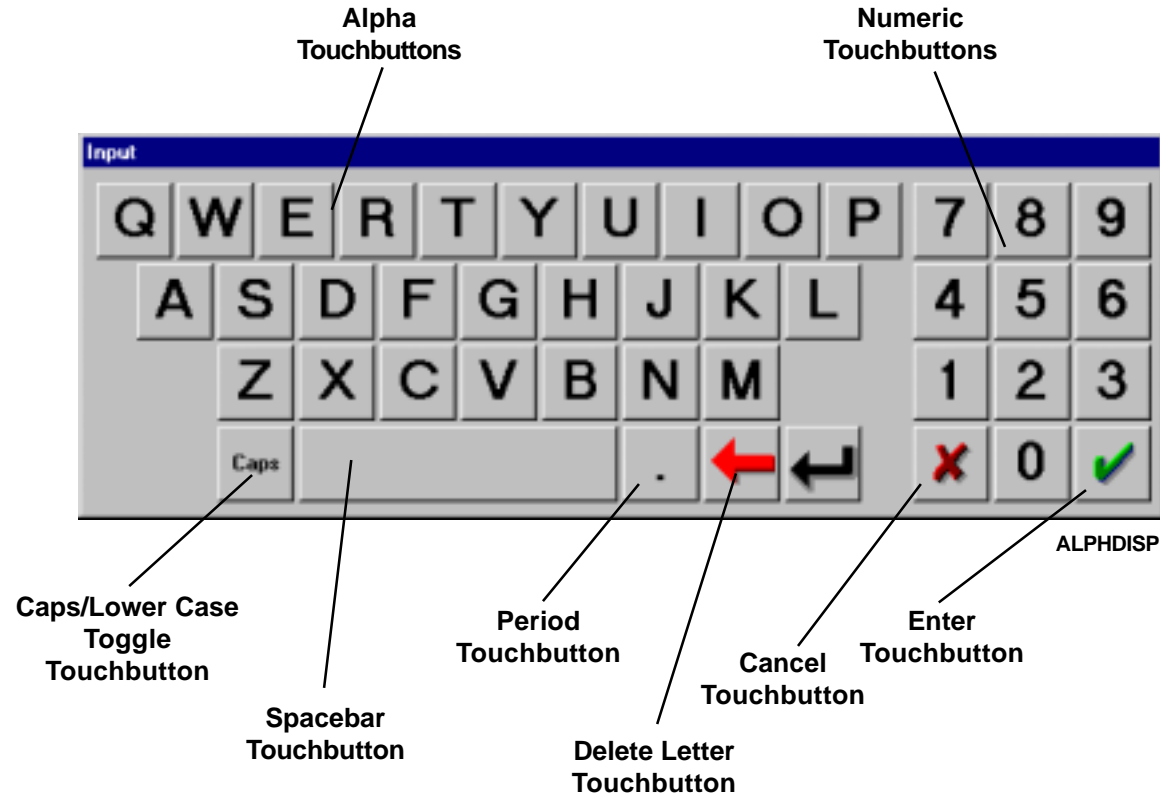


Figure 11-15. The Alpha-Numeric Pop-Up Keypad

**ENTERING THE
DRAWING
NAME**

The Alpha/Numeric Pop-Up Keypad, shown in Figure 11-15, always is used when file names are to be entered. It is always located at the bottom of the screen.

Textual data is entered by using the Alpha Touchbuttons. Numbers are entered by using the Numeric Touchbuttons. The Period Touchbutton is used to enter a period in the text. Spaces between words are added by using the Spacebar Touchbutton. Use the Upper/Lower Case Toggle Touchbutton to change from upper to lower case and back again. When this toggle is used, it automatically changes the Alpha-Touchbuttons from one case to the other. As the data is entered, it appears in the Program Title Area of the Program Selection display.

A character or space can be removed by touching the Delete Letter Touchbutton. When this touchbutton is used, it removes one character at a time, starting from the right.

The entry can be cleared completely by touching the Cancel Touchbutton.

**COMPLETING
THE SAVE
FUNCTION**

When the entry shown is that desired, touch the Enter Touchbutton on the Program Selection display. The display disappears, leaving the File Management Pop-Up Display on the screen. Touch the Enter Touchbutton on this Display to save the new program with the **.awp** extension to the system hard drive. At this point, the File Management Pop-Up Display will disappear.

It is not necessary to save the program to run it. However, if it is not saved, it will disappear when the Run/Programming Screen is closed and the machine is shut down.

Once a program is saved, it can be run immediately from the Run/Programming Screen without being called up from the system memory.

The system can also be shut down with no further action after the program is saved.

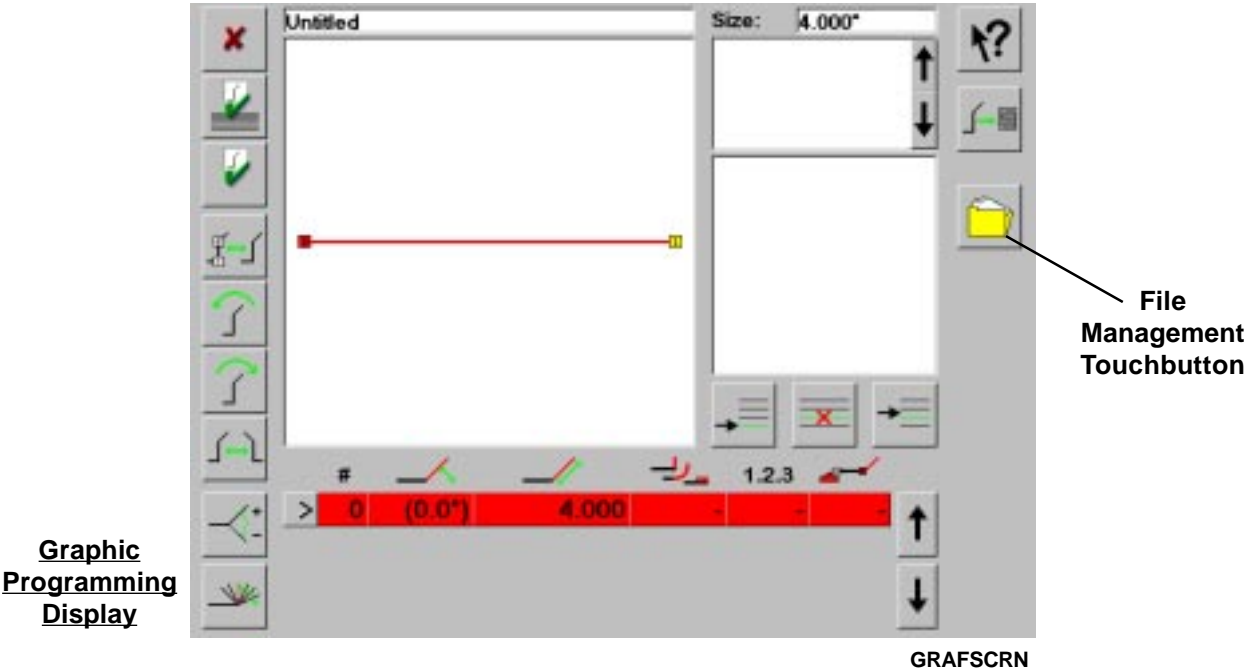
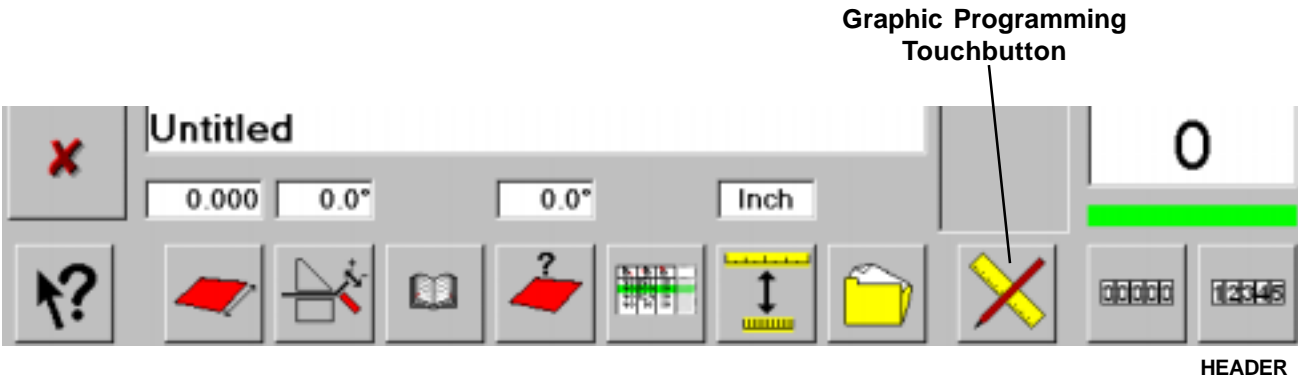


Figure 11-16. Opening a Drawing Prior to Modification

**MODIFYING OR
COMPLETING
AN EXISTING
DRAWING**

Drawings can easily be modified or completed. This section describes how to make modifications to such drawings. Begin the modification process by opening the drawing to be modified.

Touch the Graphic Programming Touchbutton on the Run/Programming Screen. This brings up the Graphic Programming Screen.

Touch the File Management Touchbutton on the Graphic Programming Screen to bring up the File Management Pop-Up Display.

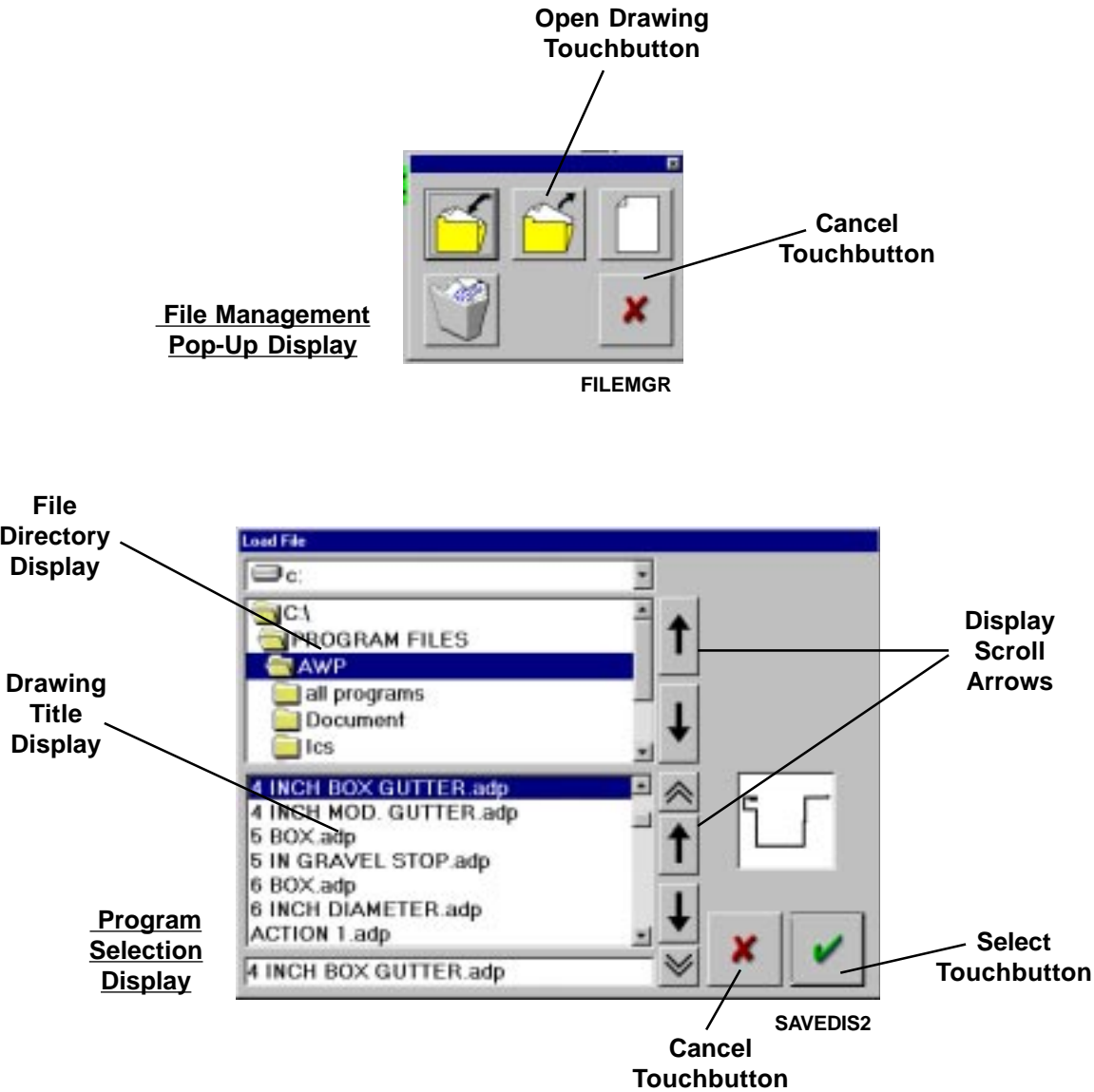


Figure 11-16. Opening a Drawing Prior to Modification (continued)

OPENING A DRAWING	Touch the File Management Touchbutton to bring up the File Management Pop-up Screen shown in Figure 11-16. Touch the open Program Touchbutton to bring up the Program Selection Pop-Up Display.
FILE DIRECTORY DISPLAY	<p>The File Directory Display shows the file structure on the computer hard drive. This is a WINDOWS-type file structure, and functions in the same way. Use the Display Scroll Arrows to move up and down within the file structure to locate the desired directory.</p> <p>When the desired directory is located, touch its screen entry to highlight it in blue.</p>
PROGRAM TITLE DISPLAY	<p>The Program Title Display shows the programs and drawings located in the highlighted directory. Drawings are identified by the .adp extension. Use the Display Scroll Arrows to move up and down through the program names to locate the desired program.</p> <p>When the desired drawing is located, touch its screen entry to highlight it in blue.</p>
SELECT TOUCHBUTTON	The Select Touchbutton calls up the drawing identified by the blue highlights. Touch it to load the drawing. The Graphic Programming Screen will reappear on the monitor.
CANCEL TOUCHBUTTON	If an incorrect drawing has been selected, touch the Cancel Touchbutton to start over.
COMPLETING THE MODIFICATION	Use the graphic drawing techniques described earlier to modify or complete the drawing.

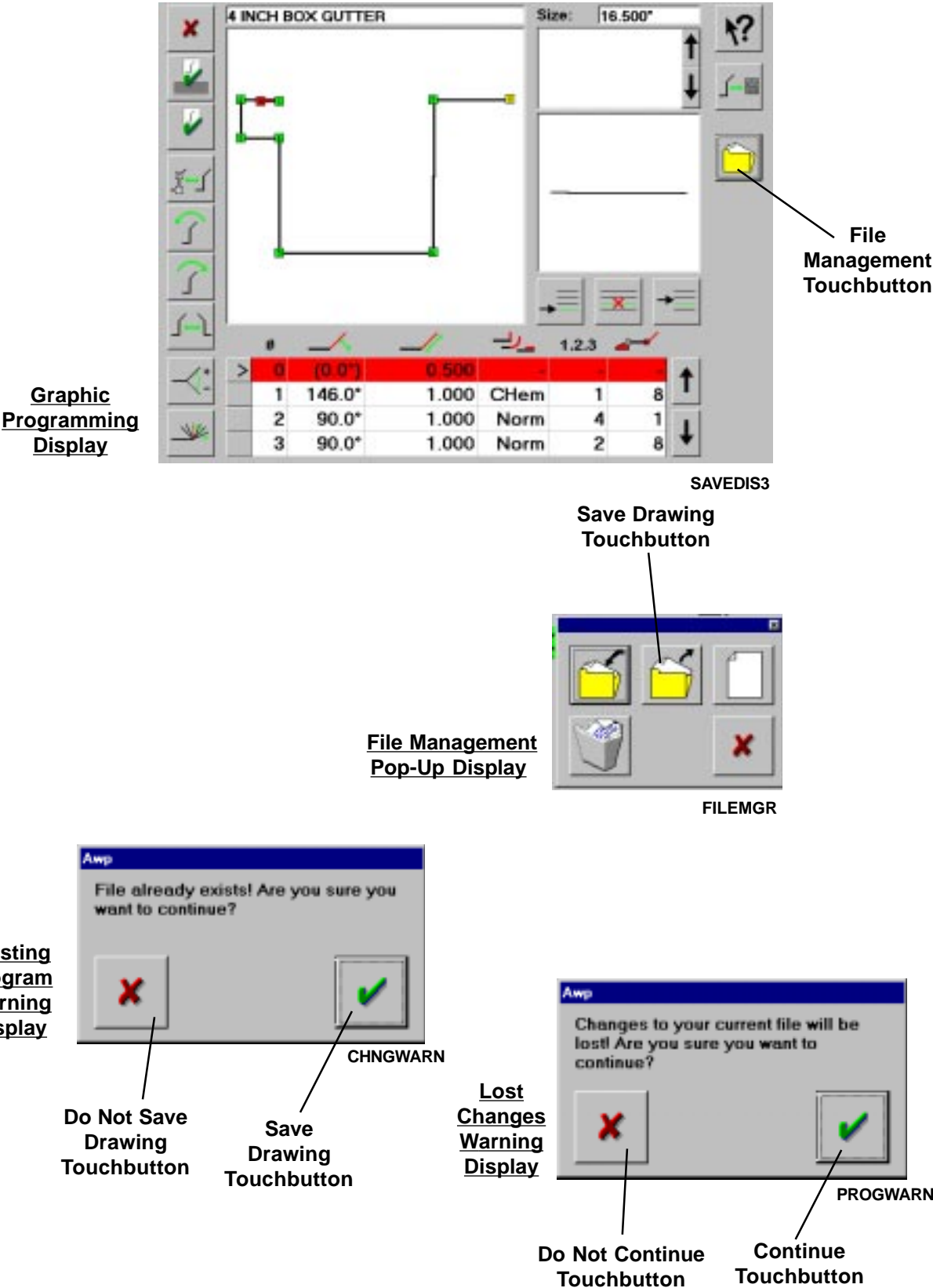


Figure 11-17. Saving a Modified Program

**SAVING A
MODIFIED
DRAWING**

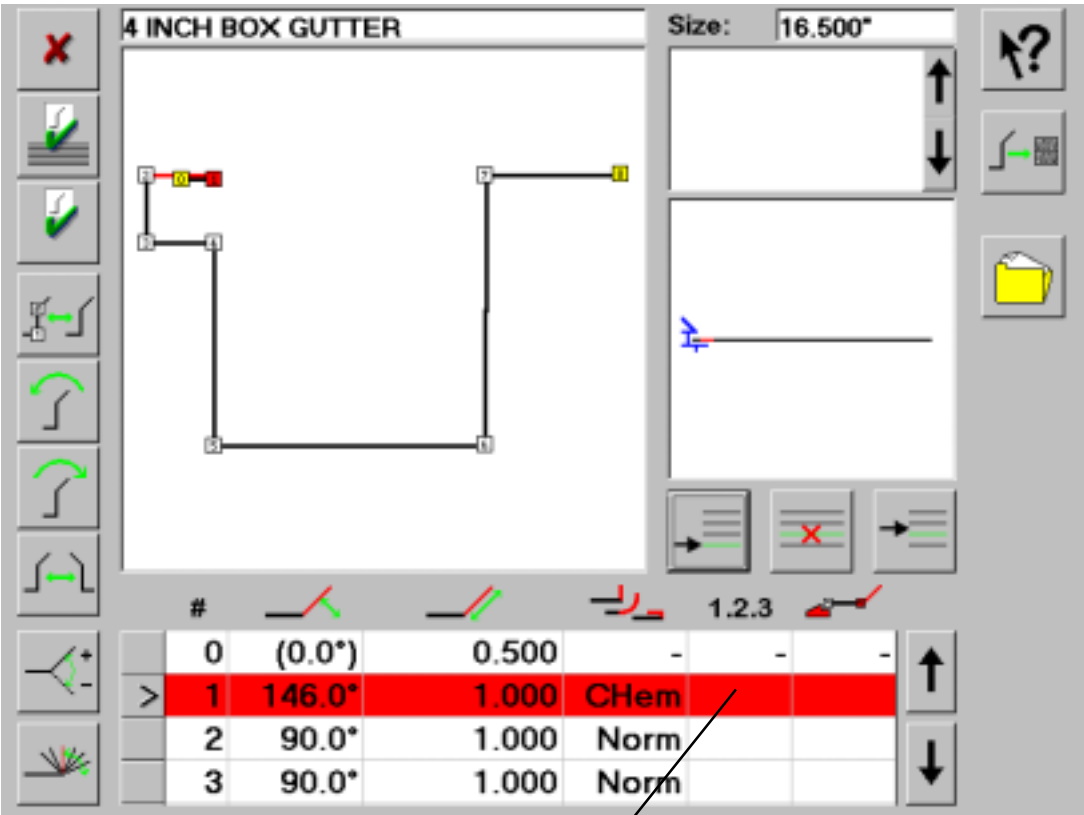
The procedure for saving a modified drawing is the same as that used to save a new drawing. However, a modified drawing can also be saved as a new drawing with a different name.

To save a modified drawing with a different name, follow the procedure used to save a new drawing. When you arrive at the point where a name must be entered, provide a new name using the same procedure as that used to provide a name to a new drawing.

If you wish to save a modified drawing using the same name, touch the Save Touchbutton on the Program Selection Screen without changing the program name. The Existing Program Warning Display will appear. Touch the Save Program Touchbutton on this display to save the modified drawing.

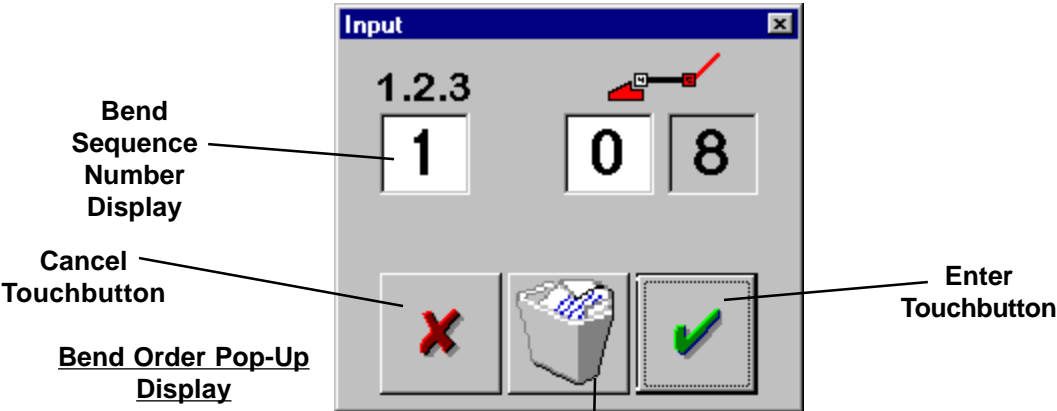
If you touch the Do Not Save Drawing Touchbutton, the Warning Display disappears, and you are given the opportunity to start the save process again from the File Management Pop-up Display.

After making changes, if you try to close the drawing without saving it, the Lost Changes Warning Display will appear. If you do not wish to lose the changes (you wish to save them), touch the Do Not Continue Touchbutton, and proceed with the save process. If you do not wish to save the changes, touch the Continue Touchbutton, and the changes to the program will be cancelled.



BENDSEQ

Bend
Order
Column



BENDSPEC

Figure 11-18. Setting the Bend Sequence

CREATING A PROGRAM FROM A DRAWING

The system will create a “program” directly from a drawing. This can be done after a drawing is created, without saving the drawing, or it can be done from an existing drawing.

Three steps are involved. The bend order must be established, the backgauge location must be established, and the details not related to the drawing must be added.

SETTING BEND ORDER

Set the bend order if it differs from the order in which the operations were entered. The bend order is entered in the Bend Order Column.

Bends must be entered in the order in which they will be formed. Touch the cell in the bend order column and in the operation which will become the first bend. The Bend Order Pop-Up Display will appear, and the bend order number “1” will appear in the Bend Sequence Number Display.

Repeat the process for the second bend operation. The number “2” will appear in the Bend Sequence Number Display. Repeat the process for each subsequent bend.

CHANGING AN INCORRECT ENTRY

If you enter an incorrect operation for a bend, touch the cancel touchbutton and the pop-up display will disappear without establishing that bend in the bend order.

MODIFYING THE BEND ORDER

Should you wish to modify the bend order after it has been established, touch the order number cell in the first operation you wish to change. When the pop-up display appears, touch the Delete Touchbutton. The pop-up display will disappear, and all order numbers after the number to be changed will be removed from the program. Then re-enter the bend order in the correct sequence, starting from the number to be changed.

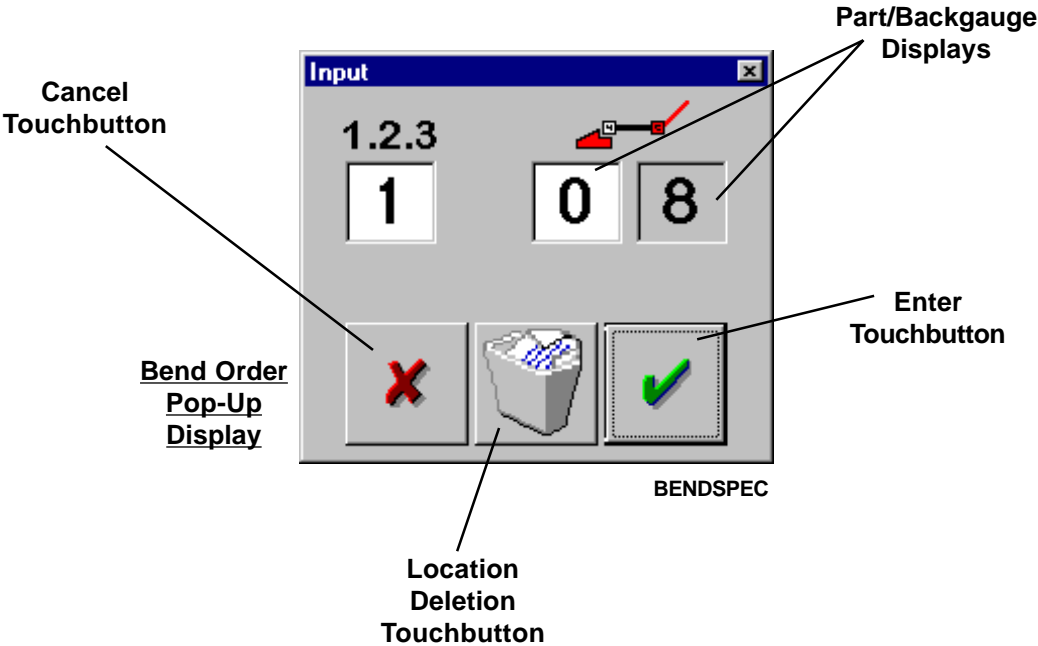
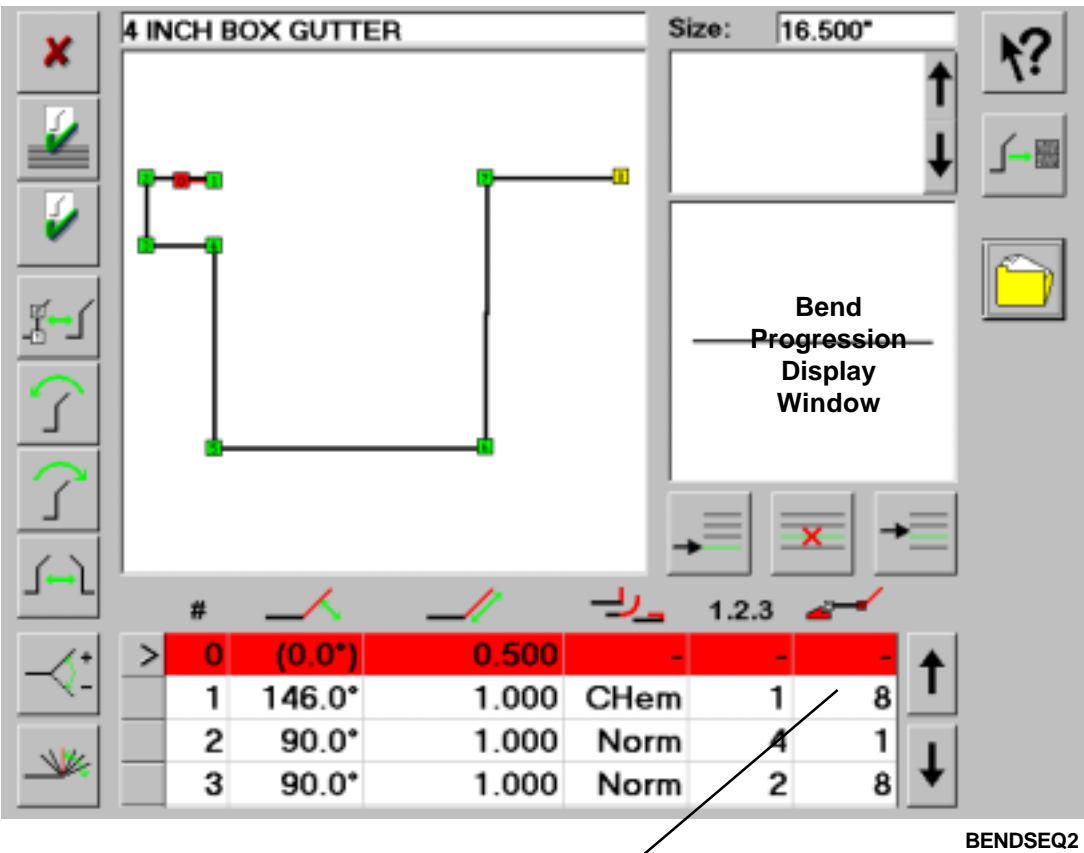


Figure 11-219. Setting the Part Location

**ESTABLISHING
PART
LOCATION**

Part location is normally established while the bend order is being established. When the Bend Order Pop-Up Display appears, Two choices for part location are provided for locating the part. The default choice is shown in white, and the alternate choice is shown “greyed out”. Each contains a number corresponding to the tag number identifying the bend. Touching the “greyed out” display will change the part location to the alternate choice.

The choice is automatically entered as part of the program when the bend sequence number is entered, and the tag number appears in the cell in the Part /Backgauge Column.

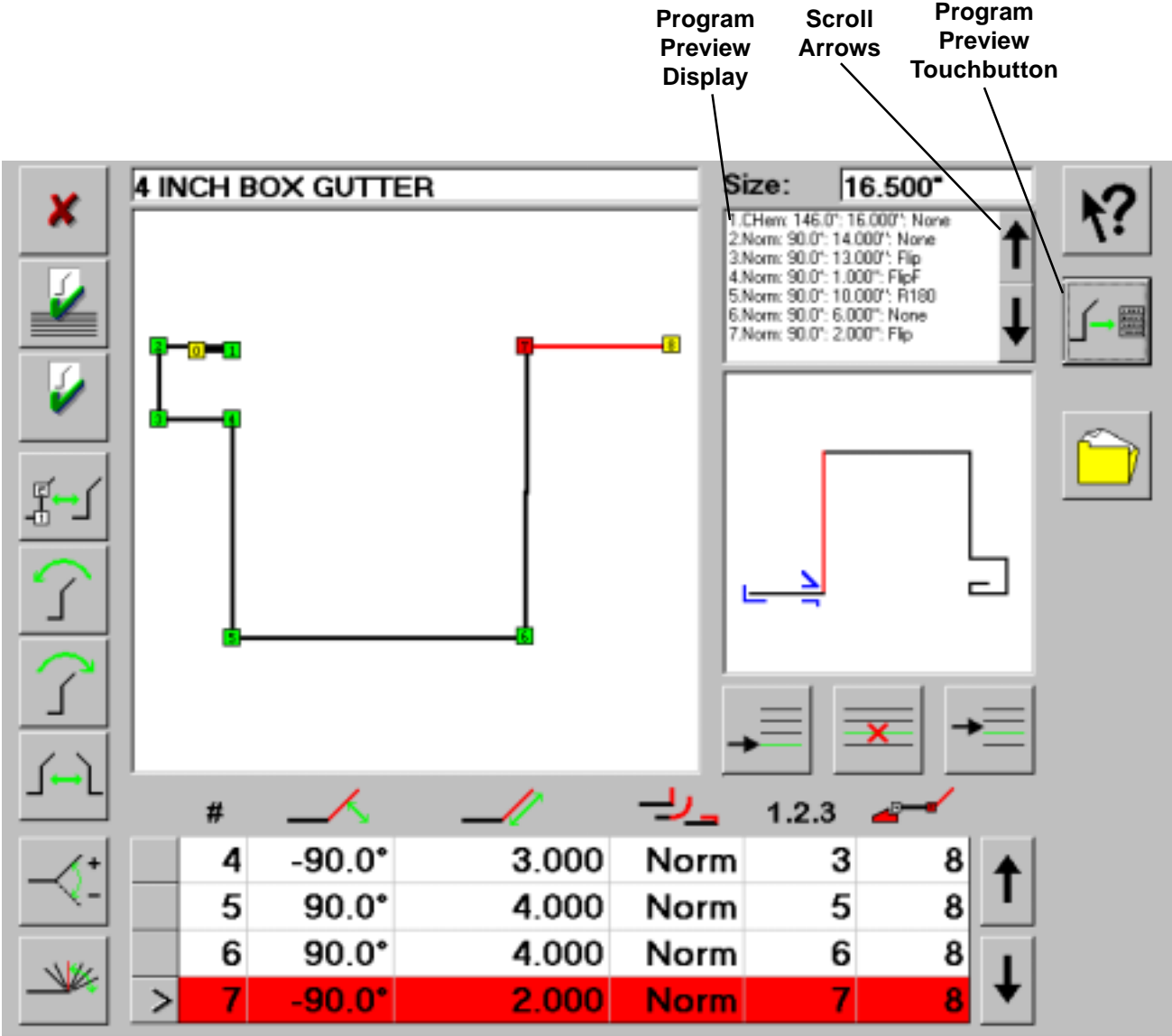
The Bend Progression Display Window shows the location of the clamp jaws and the backgauge in relation to the part. This enables the programmer to visualize the part in relation to the clamp jaws and the backgauge.

The system calculates material handling requirements from this information, and automatically includes them in the finished program.

**ESTABLISHING
ALTERNATE
PART
LOCATIONS**

The bend location provided by the system is not always the bend location desired. If a different part location is required, enter the bend sequence, and, when the pop-up display disappears, touch the cell containing the part location tag number you wish to change. The Numeric Keypad Pop-Up Display (Figure 10-9) will appear. Enter the number of the tag where you wish the part to be located. and transfer it from the keypad to the cell by pressing the Enter Touchbutton. Then continue entering the bend sequence.

Part locations can be modified at any time during the programming process by using the pop-up display.



PREVSCRN

Figure 11-20. Previewing the Completed Program

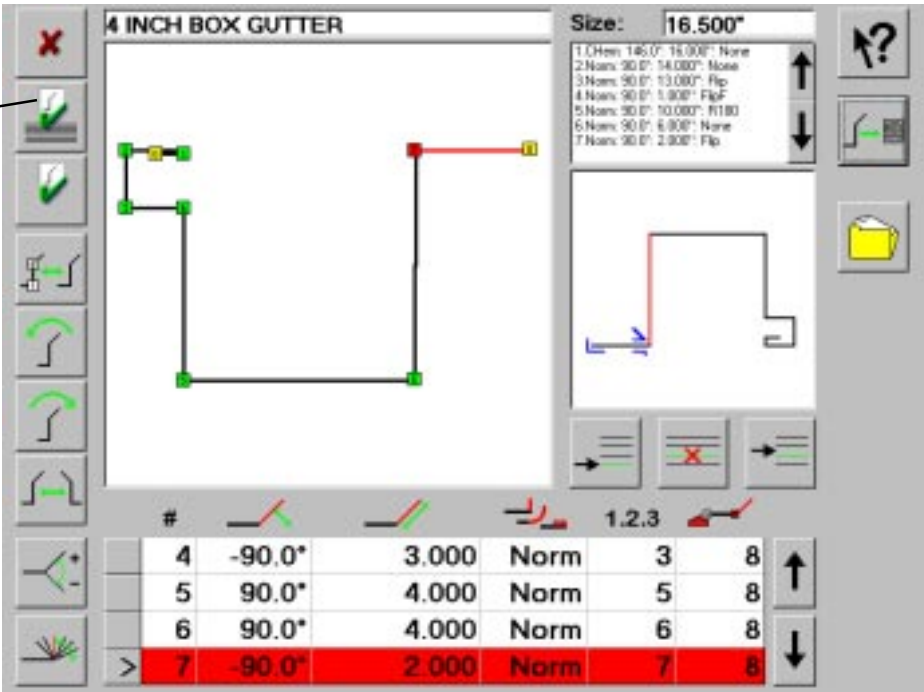
**PREVIEWING
THE PART
PROGRAM**

Although not necessary, it is wise to preview the program when the drawing is completed, and before it is saved. Touch the Program Preview Touchbutton, and the program will appear in abbreviated form, in the Program Preview Display. If necessary, use the Scroll Arrows to scroll through the program.

The drawing or the bend order can be changed at this time, and then previewed again, until the programmer is satisfied that it is correct.

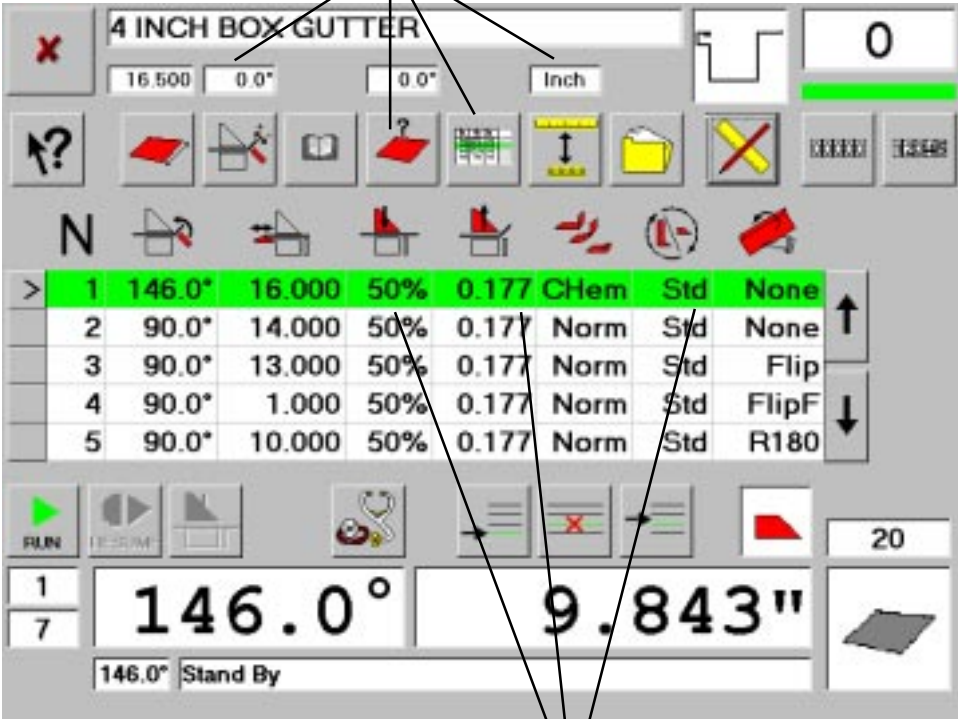
Create
Program
Touchbutton

Graphic
Programming
Screen



PREVSCRN

Areas Which May Need
Modification



MODLOCS

Areas Which May
Need Modification

Figure 11-21. Completing the Program

**ENTERING
DATA NOT
RELATED TO
THE DRAWING**

The program is still not ready for use. Certain portions of the program must be completed using manual programming techniques.

Touch the Create Program Touchbutton. This converts the data from the drawing process into a program which can be saved to system files. At the same time, the Graphic Programming Screen disappears and is replaced by the Run/Programming Screen.

**FINALIZING
THE PROGRAM**

Complete as necessary the portions of the program which have not yet been addressed. These are labelled "Areas Which May Need Modification" in Figure 11-21. Use Manual programming techniques to complete the programming process; these areas are listed and indexed (by figure number) below:

General Program Information (see Figure 10-6)

Selecting a Unit of Measure (see Figure 10-8)

General Angle Compensation (see Figure 10-8)

Angle Compensation Tables (see Figure 10-8)

Selecting Columns (see Figures 10-10 and 10-11)

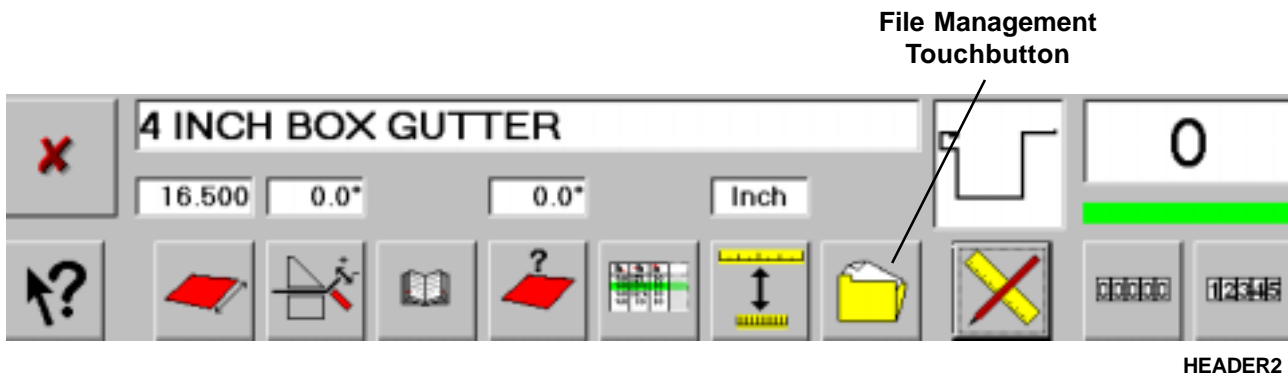
Angle Compensation for Specific Bends (see Figure 10-14)

Setting Backgauge Pause and height (see Figure 10-15)

Setting Clamping Pressure (see Figure 10-16)

Entering Tooling Data (see Figure 10-20)

The program still has not been saved to the hard drive memory. However the program can be run at this point. If the program is to be retained for future use, see Figure 11-22.



Save Program
Touchbutton

File Management
Pop-Up Display



FILEMGR

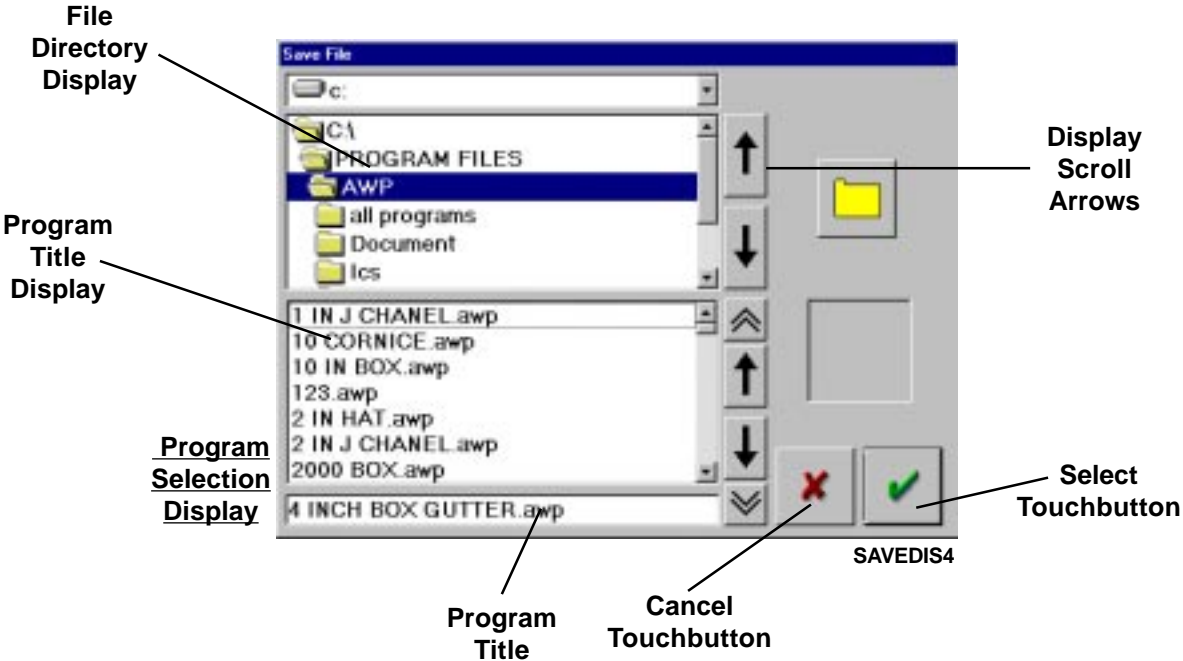


Figure 11-22. Saving a Program

**SAVING A
GRAPHIC PART
PROGRAM**

Once a graphic part program has been prepared, it can be saved to the hard drive. This involves selecting the directory in which it is to be saved on the hard drive, naming the program, and then saving it to the hard drive. See Figure 11-22.

Touch the File Management Touchbutton on the Run/Programming Screen. The File Management Pop-up Display will appear.

Touch the Save Program Touchbutton on the File Management Pop-up Display. The Program Selection Display will appear. At this point the Program Title will be "Untitled", unless the program has already been named. If so, the program name will appear.

**SELECTING
THE
DIRECTORY**

Select the directory in which the program is to be stored. Directory names will appear in the File Directory Display. If there are many directories, scroll through the list using the display scroll arrows until the desired directory is found. Touch the directory name to select it.

Touch the Program Title area in the Program Title Display. The Alpha-Numeric Pop-up Keypad, shown in Figure 11-23, will appear.

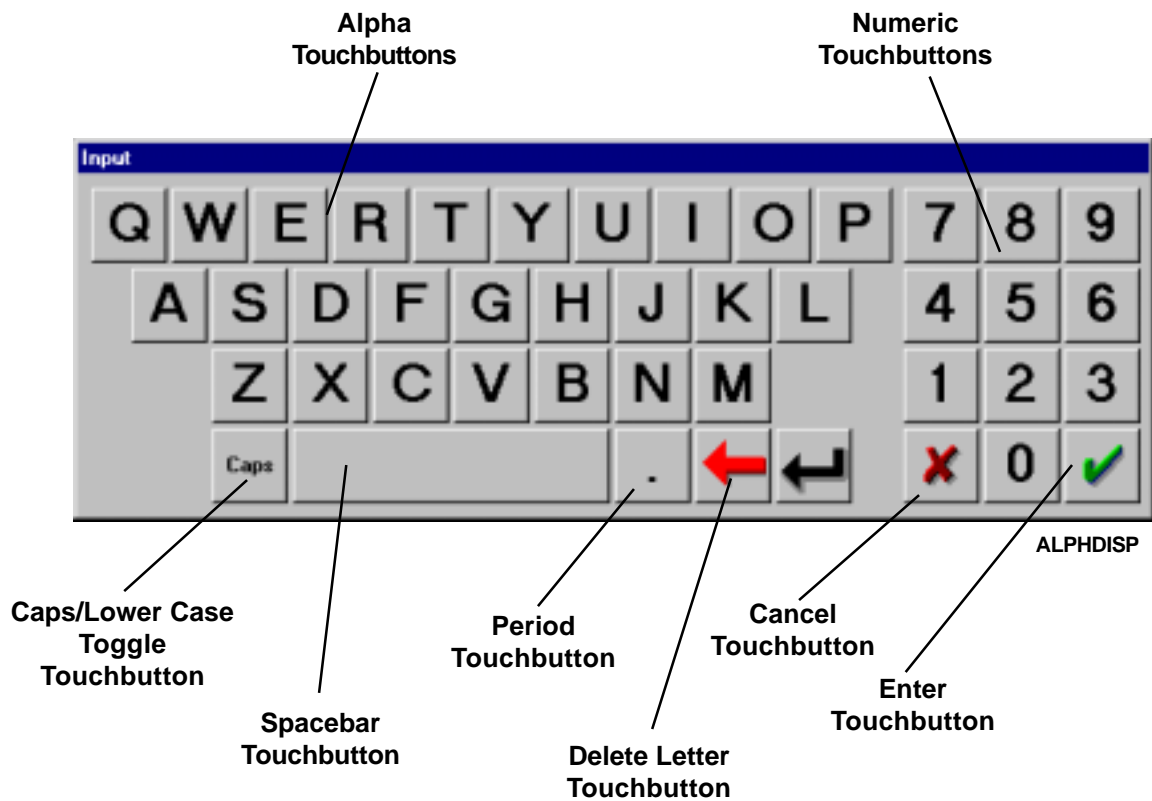


Figure 11-23. The Alpha Pop-Up Keypad

ENTERING THE PROGRAM NAME	<p>The Alpha/Numeric Pop-Up Keypad, shown in Figure 11-23, always is used when file names are to be entered. It is always located at the bottom of the screen.</p> <p>Textual data is entered by using the Alpha Touchbuttons. Numbers are entered by using the Numeric Touchbuttons. The Period Touchbutton is used to enter a period in the text. Spaces between words are added by using the Spacebar Touchbutton. Use the Upper/Lower Case Toggle Touchbutton to change from upper to lower case and back again. When this toggle is used, it automatically changes the Alpha-Touchbuttons from one case to the other. As the data is entered, it appears in the Program Title Area of the Program Selection display.</p> <p>A character or space can be removed by touching the Delete Letter Touchbutton. When this touchbutton is used, it removes one character at a time, starting from the right.</p> <p>The entry can be cleared completely by touching the Cancel Touchbutton.</p>
COMPLETING THE SAVE FUNCTION	<p>When the entry shown is that desired, touch the Enter Touchbutton on the Program Selection display. The display disappears, leaving the File Management Pop-Up Display on the screen. Touch the Enter Touchbutton on this Display to save the new program with the .awp extension to the system hard drive. At this point, the File Management Pop-Up Display will disappear.</p> <p>It is not necessary to save the program to run it. However, if it is not saved, it will disappear when the Run/Programming Screen is closed and the machine is shut down.</p> <p>Once a program is saved, it can be run immediately from the Run/Programming Screen without being called up from the system memory.</p>
OPTIONS	<p>The system can also be shut down with no further action after the program is saved.</p>

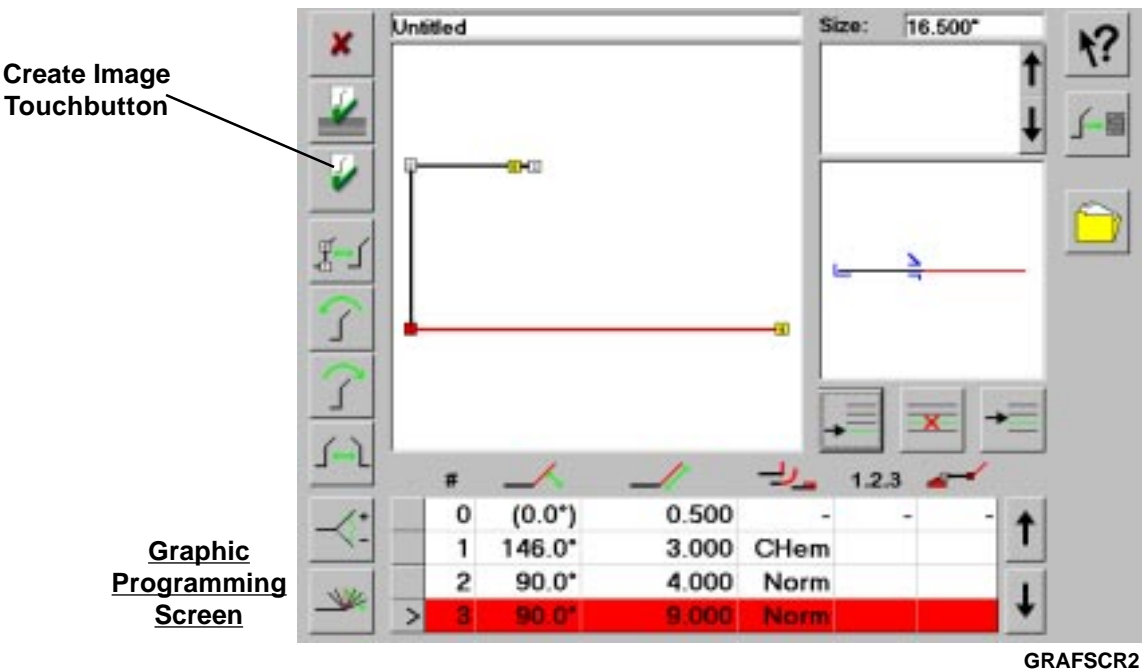
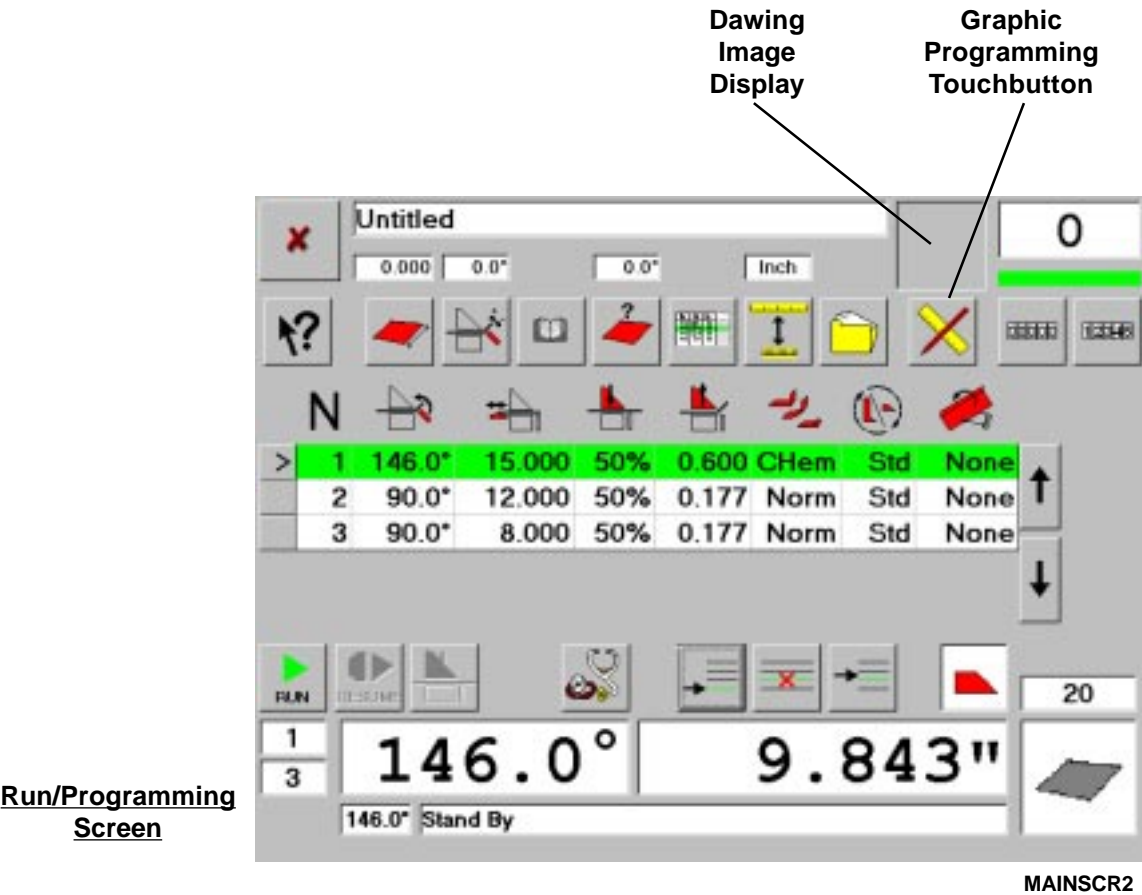


Figure 11-24. Attaching a Drawing to a Manual Program

**ATTACHING A
DRAWING TO
AN EXISTING
PROGRAM**

A drawing can be attached to an existing manually prepared program.

Open the manual program according to the instructions accompanying Figure 10-24 in Section 10, Manual Programming

When the program is open, touch the Graphic Programming Touchbutton. This will bring up the Graphic Programming Screen shown in Figure 11-24.

If the desired drawing already exists, open it according to the instructions accompanying Figure 11-16. If it does not exist, create it at this time.

Touch the Create Image Touchbutton on the Graphic Programming Screen. The Pop-Up Displays and the Graphic Programming Screen will disappear, and the drawing image will appear in the Drawing Image Display on the Run/Programming Screen.

Save the program according to the instructions accompanying Figure 10-25 in Section 10, Manual Programming.

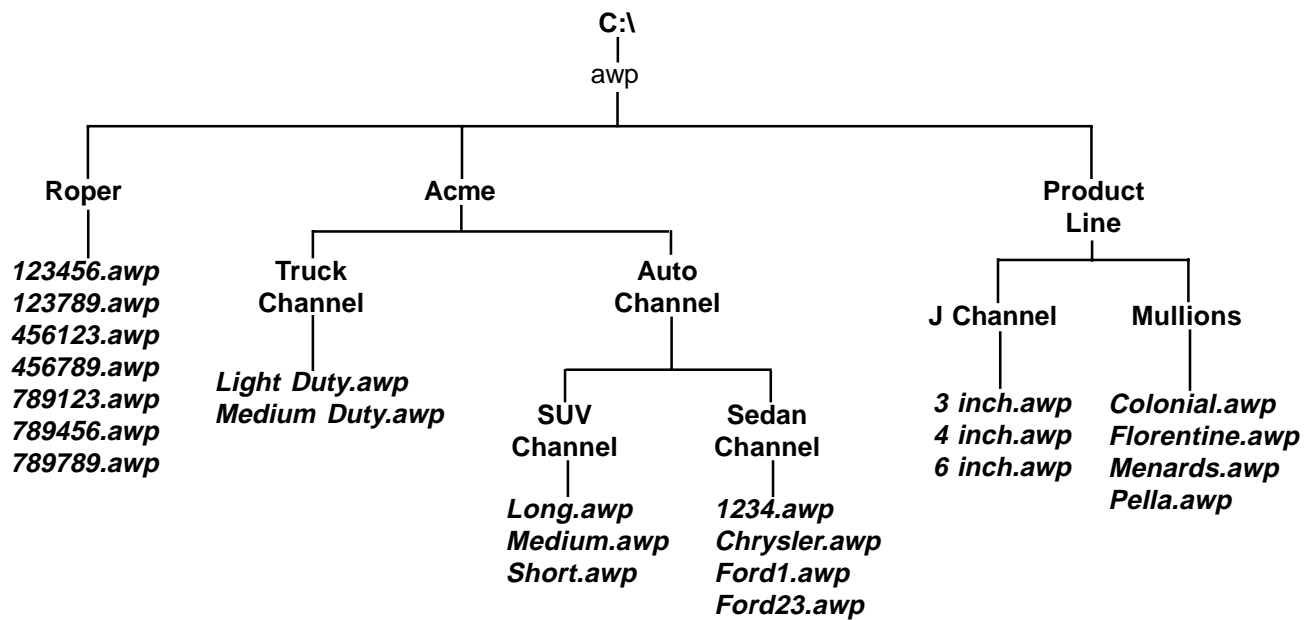


Figure 12-1. A Good File Management Structure

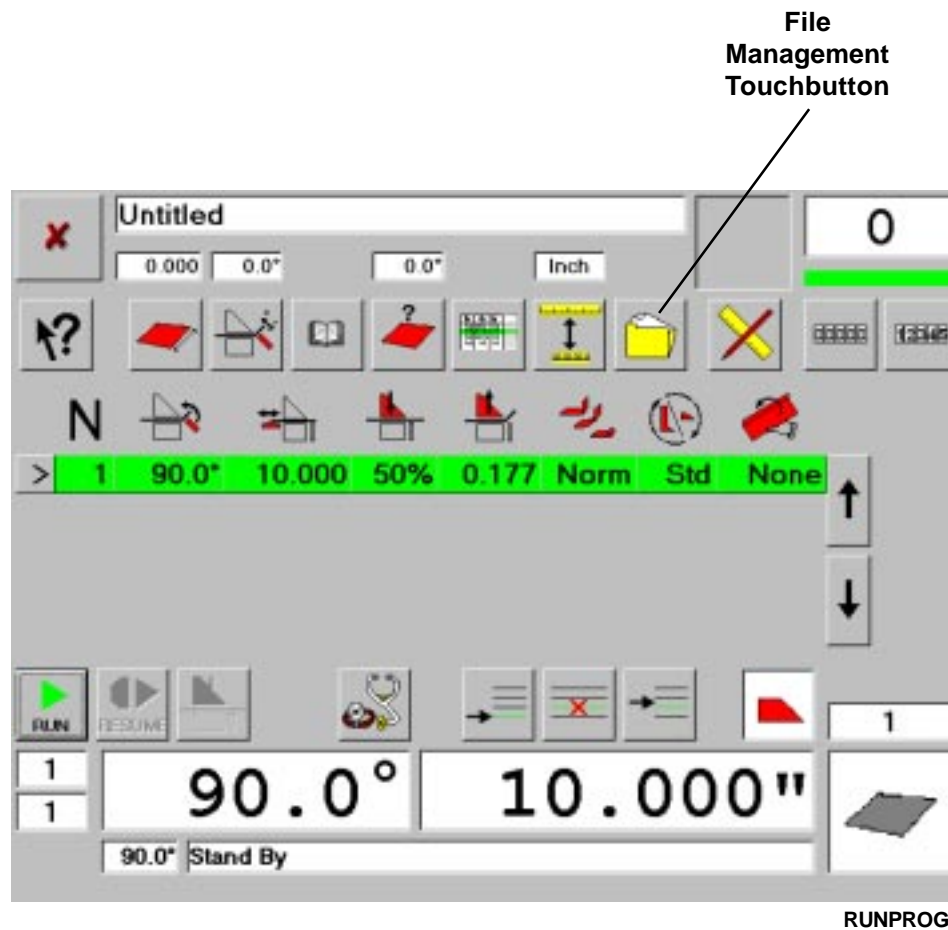


Figure 12-2. The Run/Programming Screen and the File Management Touchbutton

SECTION 12

FILE MANAGEMENT

File Management in the Orion System is based on the WINDOWS file management system. An understanding of the WINDOWS file management system will make the Orion system easy to understand. Programs are stored on the hard disk identified as the C:\ drive, in a series of directories (folders) and subdirectories, with file names identified by the **.awp** extension.

There are some important differences. The Orion system does not duplicate WINDOWS file management screens or messages; It has its own set of screens and messages which are designed specifically to manage programs prepared and used in the Orion system.

The Orion file management system treats programs similar to the way in which WINDOWS manages material developed by specific application programs. Program files can be saved directly from the programming activities of the Orion system, but separate procedures are used to manage files outside the programming activities.

ORGANIZATION Just as with the WINDOWS system, good organization will lead to successful file management. Unless you have a very limited number of programs, do not save all your program files in a single directory on the C:\ drive. Instead, take advantage of the ability to create directories and subdirectories to separate and categorize your programs. There is sufficient hard drive memory to accomodate the most extensive set of programs.

Categorize your programs according to your needs. You may use customers, part types, materials, part numbers, anything that will let you organize your files systematically. Figure 12-1 shows such a file structure. The italicized entries are program files; the rest are directories and subdirectories.

GETTING STARTED To begin file management, touch the File Management Touchbutton shown in Figure 12-2, This will bring up the File Management Screen shown in Figure 12-3.

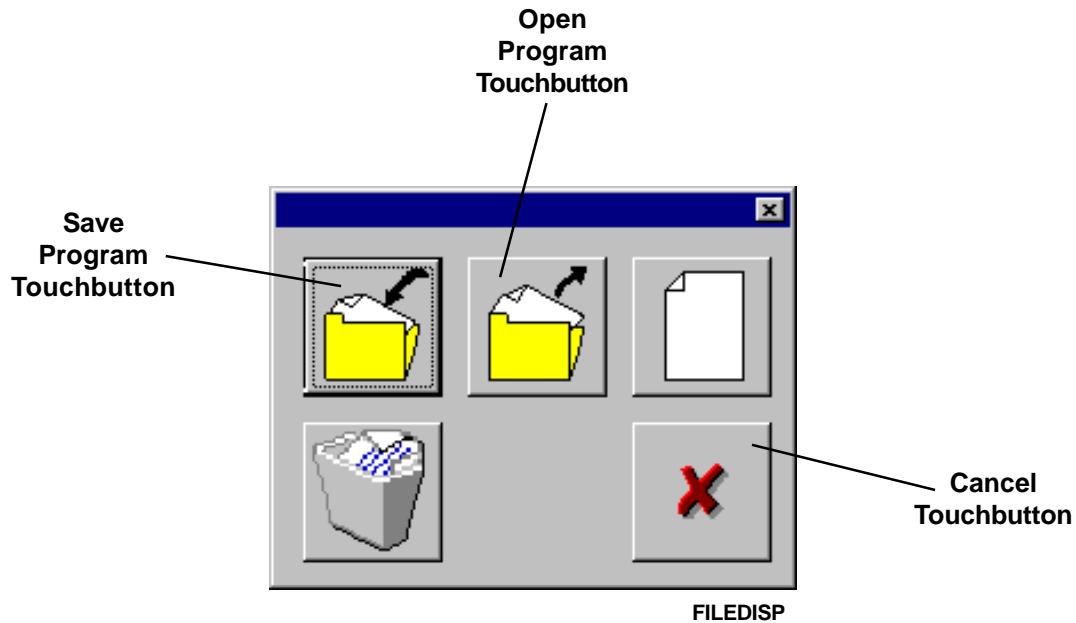


Figure 12-3. The File Management Pop-Up Display

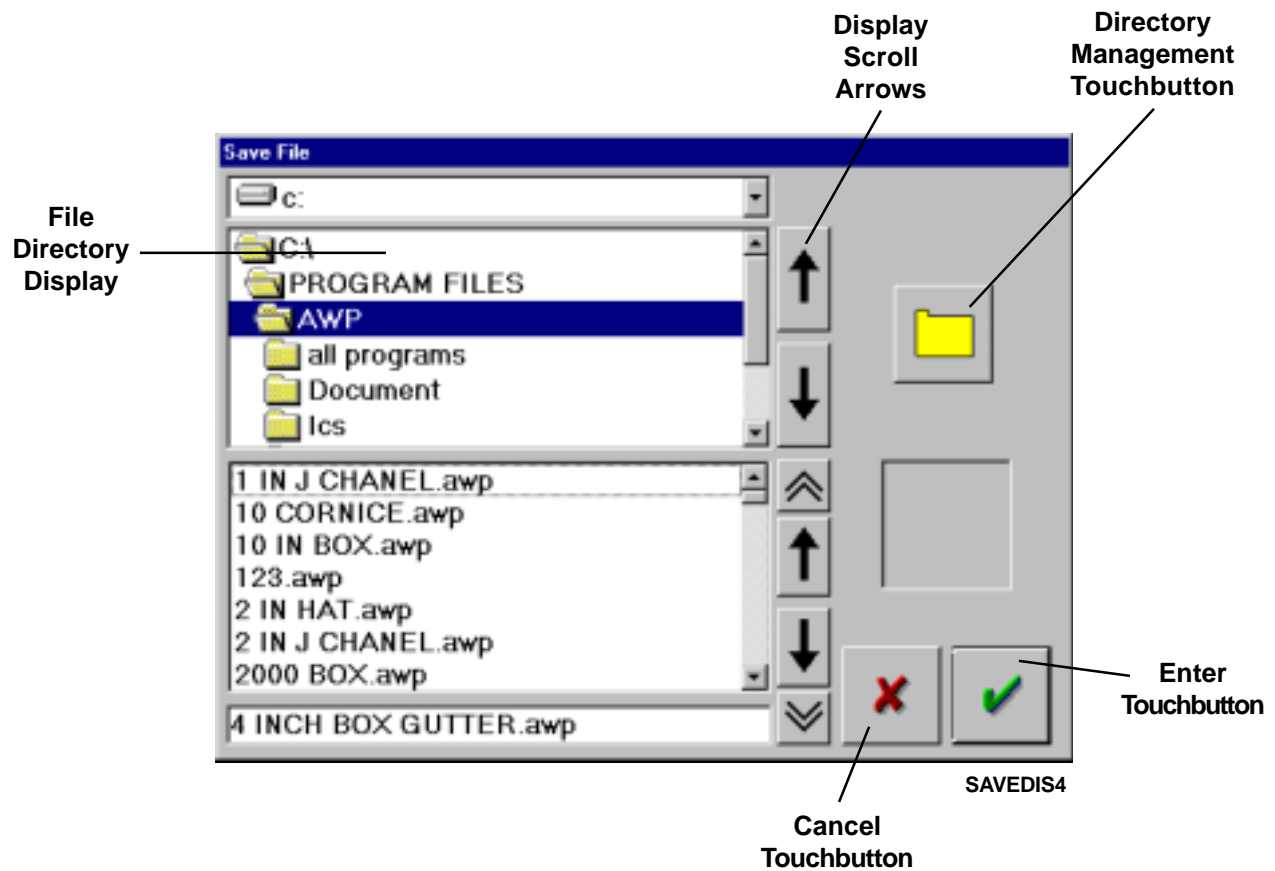


Figure 12-4. Program Selection Display

**MANAGING
DIRECTORIES
(FOLDERS)**

Directories can be created or removed at any time. Most file management activity dealing with directories is the result of creating new programs or modifying existing programs, but directories can be created or deleted independently from programming activities.

**CREATING A
NEW
DIRECTORY**

To create a new directory, touch the Save Program Touchbutton in the File Management Pop-Up Display shown in Figure 12-3. The Program Selection Display will appear on the screen.

The new directory will be a directory or subdirectory on the C:\ drive. Find the directory under which the new directory should exist. Touch it to highlight it in blue.

Touch the Directory Management Touchbutton to bring up the New Value Pop-Up Display (Figure 12-5) and the Alpha-Numeric Pop-Up Keypad. They will appear at the same time.

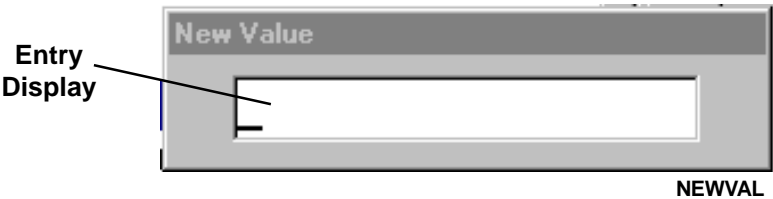


Figure 12-5. New Value Pop-Up Display

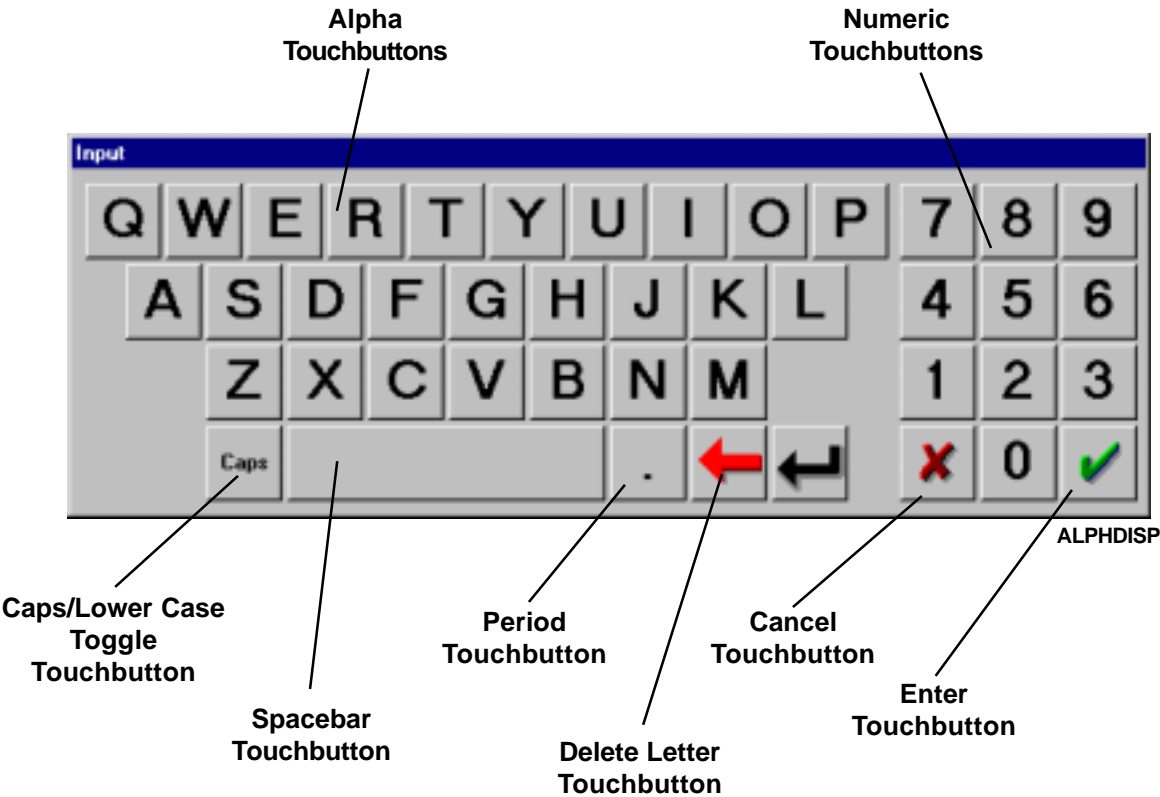


Figure 12-6. The Alpha-Numeric Pop-Up Keypad

**ALPHA-
NUMERIC
POP-UP
KEYPAD**

The Alpha-Numeric Pop-Up Keypad, shown in Figure 12-6, always appears when text-type data must be entered. It is always located at the bottom of the screen.

Textual data is entered by using the Alpha Touchbuttons. Numbers are entered by using the Numeric Touchbuttons. The Period Touchbutton is used to enter a period in the text. Spaces between words are added by using the Spacebar Touchbutton. Use the Upper/Lower Case Toggle Touchbutton to change from upper to lower case and back again. When this toggle is used, it automatically changes the Alpha-Numeric touchpads from one case to the other.

A new line can be started in certain displays by touching the New Line Touchbutton.

It must be remembered that numerals entered from this pop-up keypad contain no mathematical value; they are treated as alphabetical characters instead. This does not preclude the use of numerals for identification or description purposes. For instance, a program title such as "3.500 inch J Channel" can be entered, but the "3.500" portion of the entry carries no mathematical value within the program.

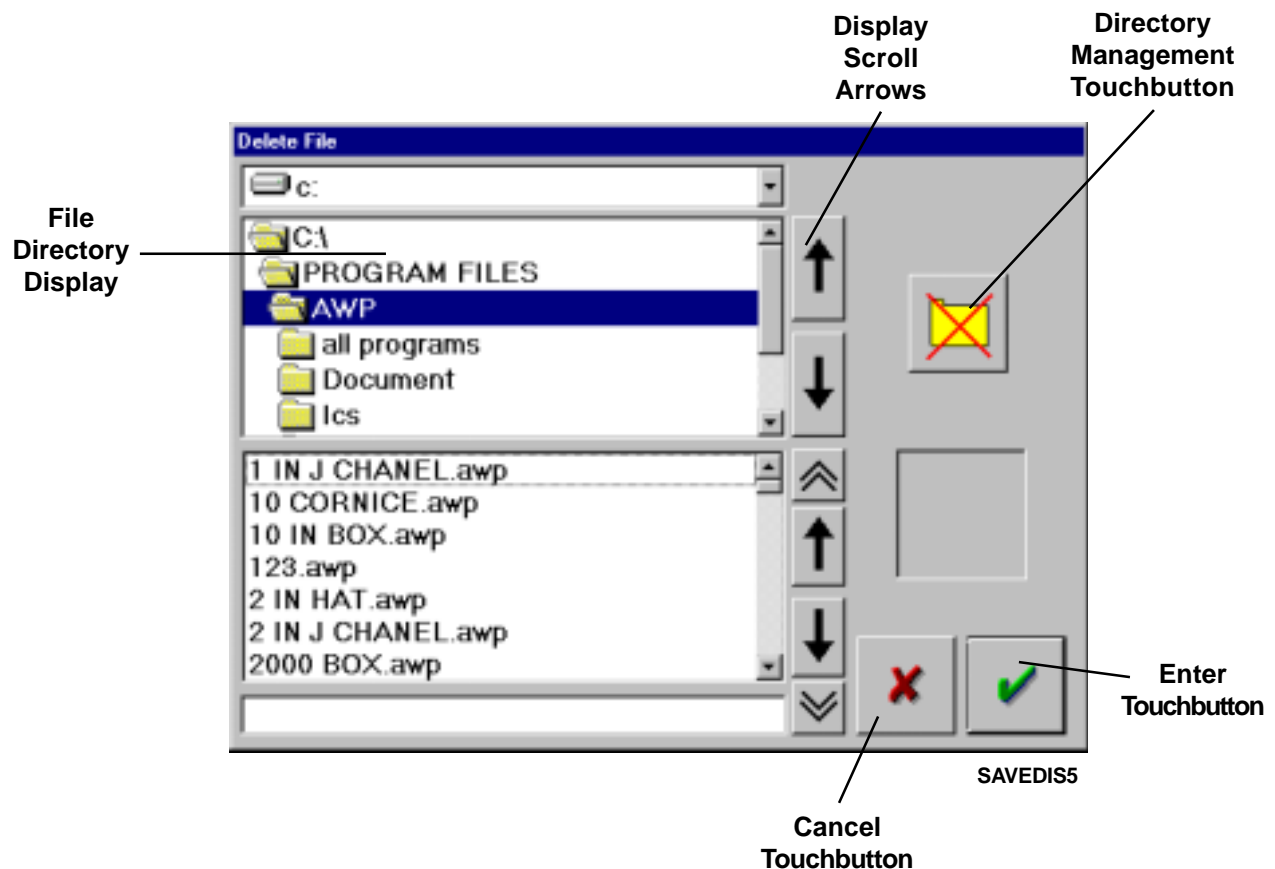
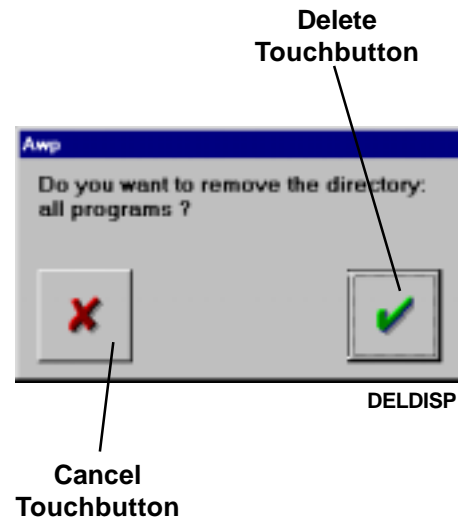
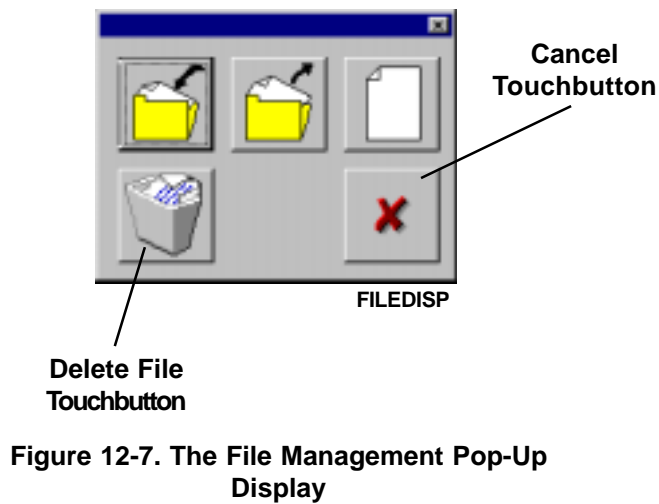
A character or space can be removed by touching the Delete Letter Touchbutton. When this touchbutton is used, it removes one character at a time, starting from the right.

The entry can be cleared completely by touching the Cancel Touchbutton.

**COMPLETING
DIRECTORY
CREATION**

When the entry shown is that desired, the Enter Touchbutton is used to enter it into the file structure. If the entry is in a pop-up display, it moves to the the appropriate display and the pop-up display disappears. The Alpha-Numeric Pop-Up Keypad then disappears from the screen.

To incorporate the newly created directory into the disk file structure, touch the Enter Touchbutton on the Program Selection display (Figure 12-4). The display disappears, leaving the File Management Pop-Up Display on the screen. Touch the Cancel Touchbutton on this Display and it disappears. The New Directory is now a part of the file structure on the system hard disk.



**DELETING A
DIRECTORY**

Touch the File Management Touchbutton shown in Figure 12-2. This will bring up the File Management Screen shown in Figure 12-7.

Touch the Delete File Touchbutton in the File Management Pop-Up Display shown in Figure 12-7. The Program Selection Display (Figure 12-8) will appear on the screen.

The directory will be a directory or subdirectory on the C:\ drive. Find the directory under which the directory to be deleted exists. Touch it to highlight it in blue.

The Directory Management Touchbutton now contains a red "X" across it. Touch the touchbutton and the Delete Directory Display (Figure 12-9) will appear on the screen. Touching the Cancel Touchbutton will not remove the directory from the system.

Touch the Delete Touchbutton in the Delete Directory Display. The display will disappear, and the highlighted directory will disappear from the File Structure Display portion of the Program Selection Display.

Touch the Cancel Touchbutton in the Program Selection Display to remove it from the screen. Touch the Cancel Touchbutton in the File Management Pop-Up Display to remove it from the screen. The selected directory has now been removed from the system hard drive.

NOTE:

Directories cannot be deleted until they are empty. If the directory to be deleted contains a program file, delete the program file according to the instructions with Figure 12-10.

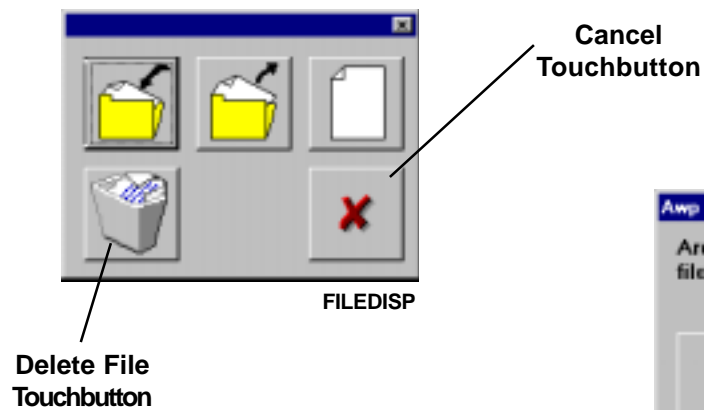


Figure 12-11. The File Management Pop-Up Display

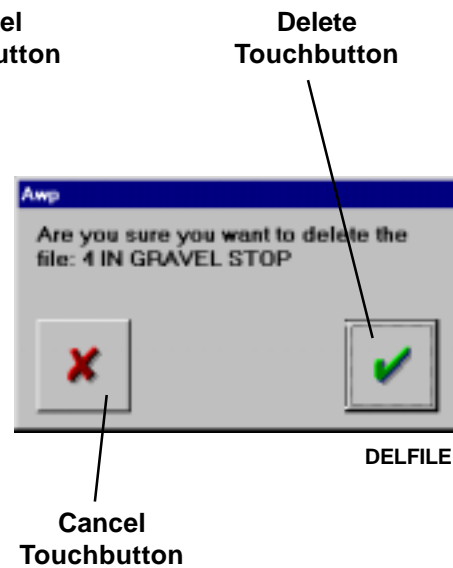


Figure 12-13. Delete File Display

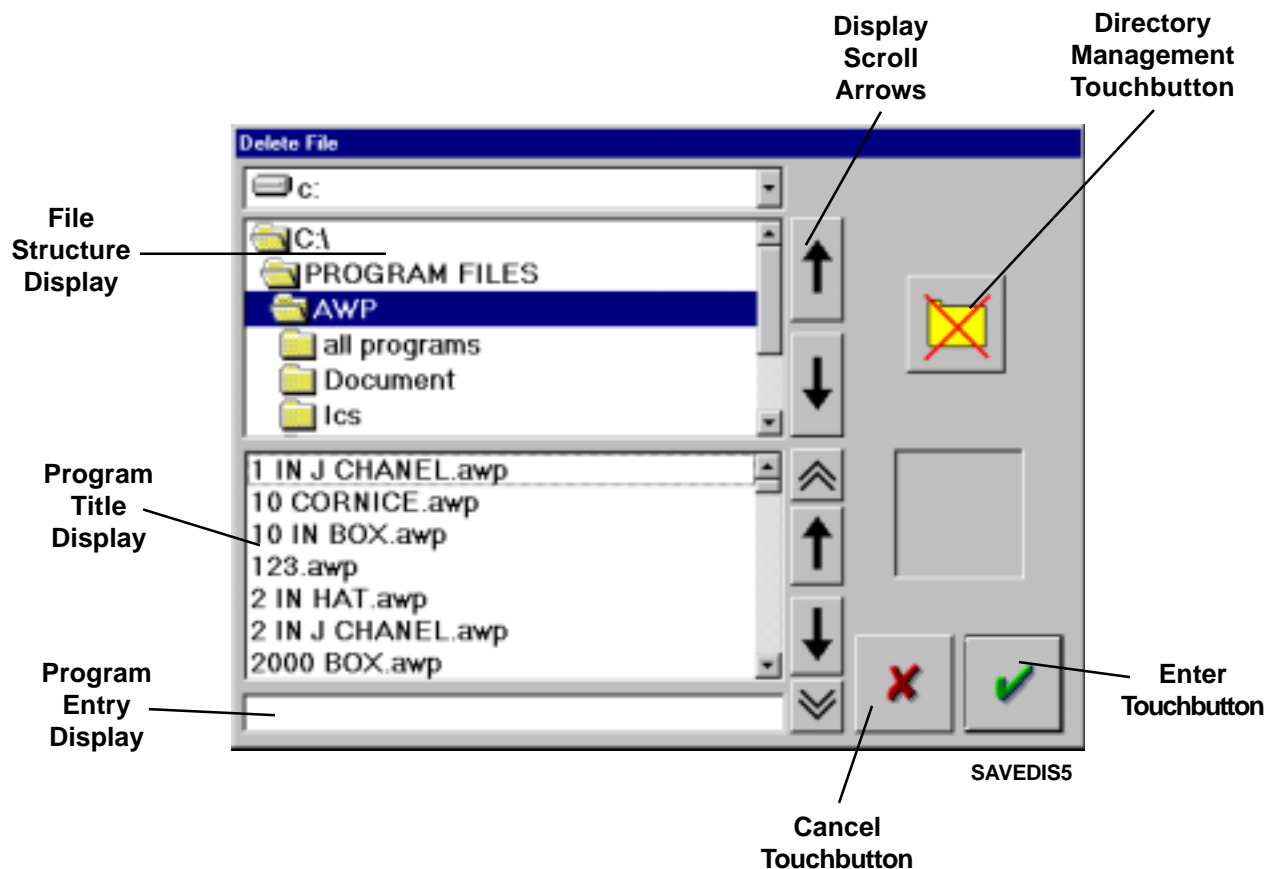


Figure 12-12. Program Selection Display

**DELETING AN
UNWANTED
FILE**

Touch the File Management Touchbutton shown in Figure 12-2, This will bring up the File Management Display shown in Figure 12-11.

Touch the Delete Program Touchbutton in the File Management Pop-Up Display shown in Figure 12-11. The Program Selection Display (Figure 12-12) will appear on the screen.

The file will be located in C:\, or one of the subdirectories below it. Find the directory in which the file will exist. Touch the directory listing to highlight it in blue.

Touch the file entry to be deleted to highlight it in blue. The entry will also appear in the Program Entry Display.

The Directory Management Touchbutton now contains a red "X" across it. Touch the Enter Touchbutton and the Delete File Display (Figure 12-13) will appear on the screen.

Touch the Delete Touchbutton in the Delete Directory Display. The display will disappear, and the highlighted file will disappear from the File Directory Display portion of the Program Selection Display.

Touch the Cancel Touchbutton in the Program Selection Display to remove it from the screen. Touch the Cancel Touchbutton in the File Management Pop-Up Display to remove it from the screen. The selected file has now been removed from the system hard drive.

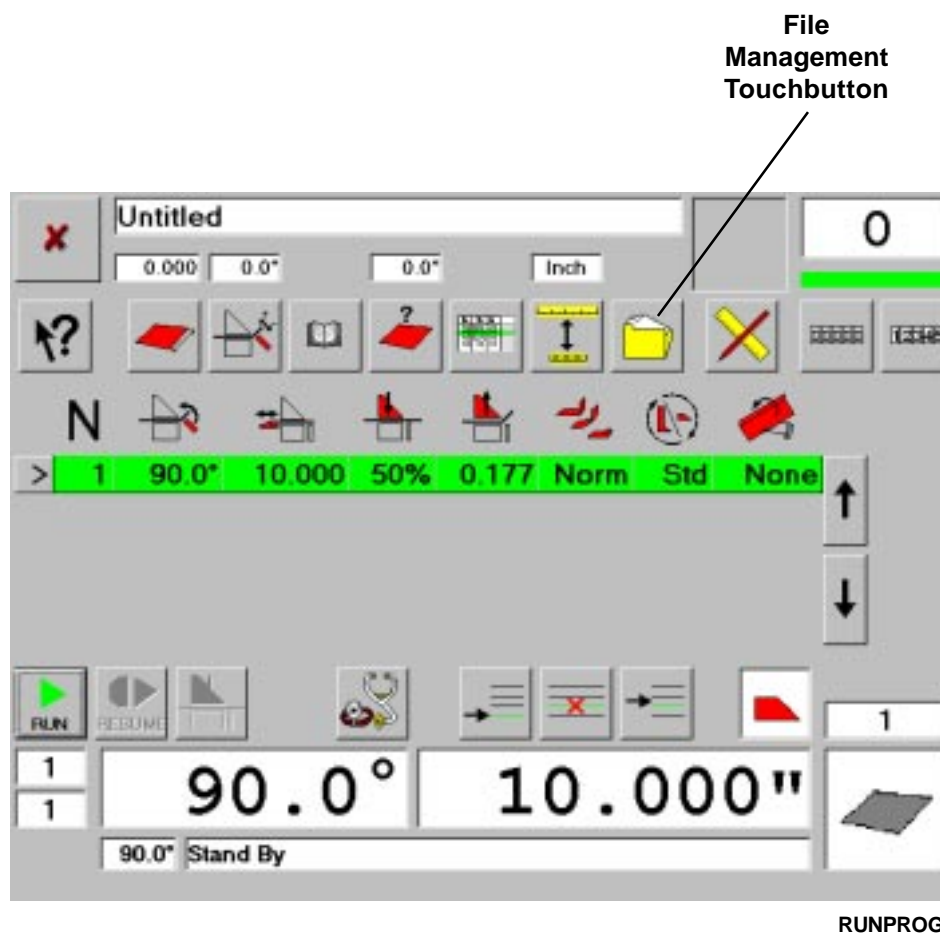


Figure 12-14. The Run/Programming Screen and the File Management Touchbutton

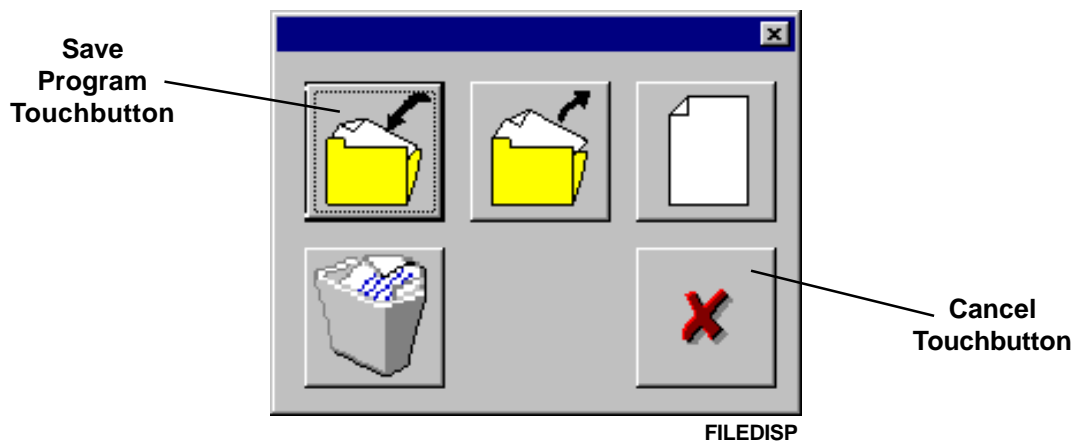


Figure 12-15. The File Management Pop-Up Display

**SAVING
PROGRAMS**

Programs must be saved after they have been created or modified. Instructions for saving programs are contained in Section 10, Manual Programming, beginning with Figure 10-22; and in Section 11, Graphic Programming, beginning with Figure 11-15.

Programs which have been run need not be saved unless they have been modified and it is desirable to save the modifications.

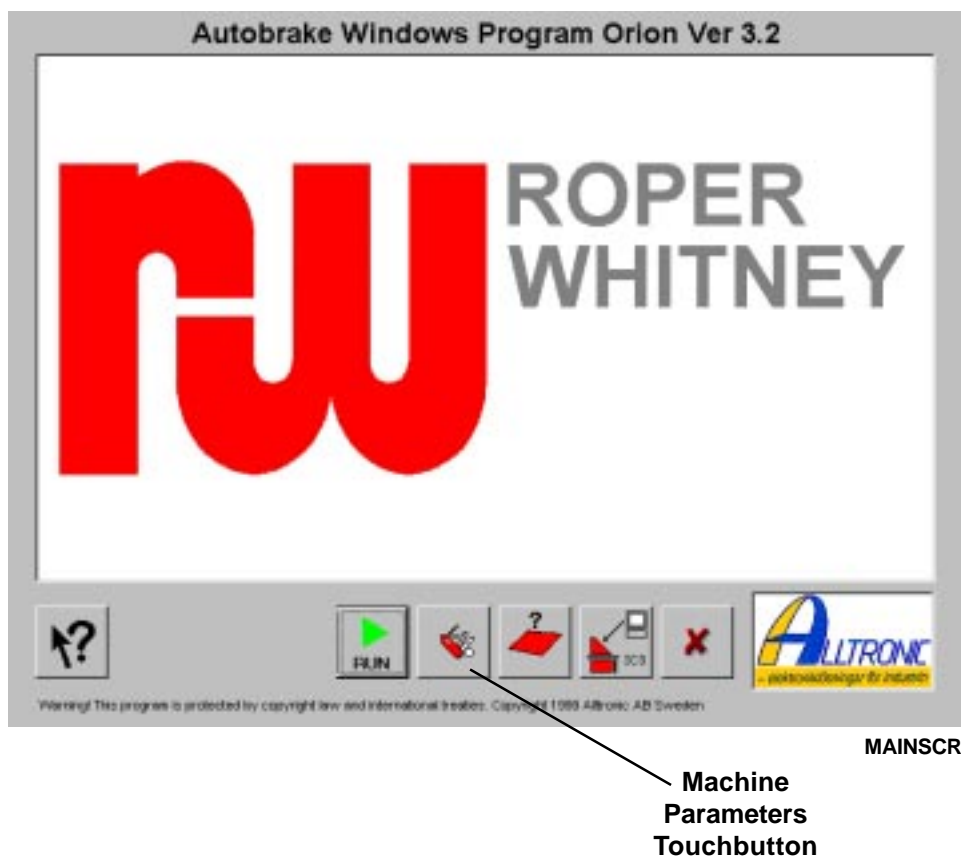


Figure 13-1. Mainscreen

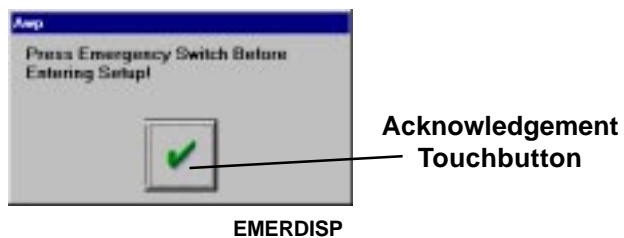


Figure 13-2. Emergency Stop Pop-Up Display

SECTION 13

MACHINE PARAMETERS

Machine Parameters control the performance and limits of the machine. Parameters are shown in the screens listed below.

Backgauge Settings (See Figure 13-3.)

Bending Beam Settings (See Figure 13-4.)

Kombi Beam Settings (See Figure 13-5.)

Clamping Beam Settings (See Figure 13-6.)

System Settings (See Figure 13-7.)

Default Settings (See Figure 13-9 and 13-10.)

Each setting screen has a tab at the top which identifies it. All the tabs are visible on each screen. Pressing any tab displays its associated setting screen.

Parameters in effect can be viewed at any time for reference. However, they cannot be changed without using the system security password. Changes should only be made by qualified personnel. See Section 3, Security, for parameter change procedures.

GETTING STARTED

Touch the Machine Parameters Touchbutton on the Main Screen (Figure 13-1) to bring up the Emergency Stop Pop-Up Display (Figure 13-2).

Press the red Emergency Stop Pushbutton located on the right side of the console next to the screen.

Touch the Acknowledgement Touchbutton on the Emergency Stop Pop-Up Display. This will bring up the Backgauge Settings Screen shown in Figure 13-3.

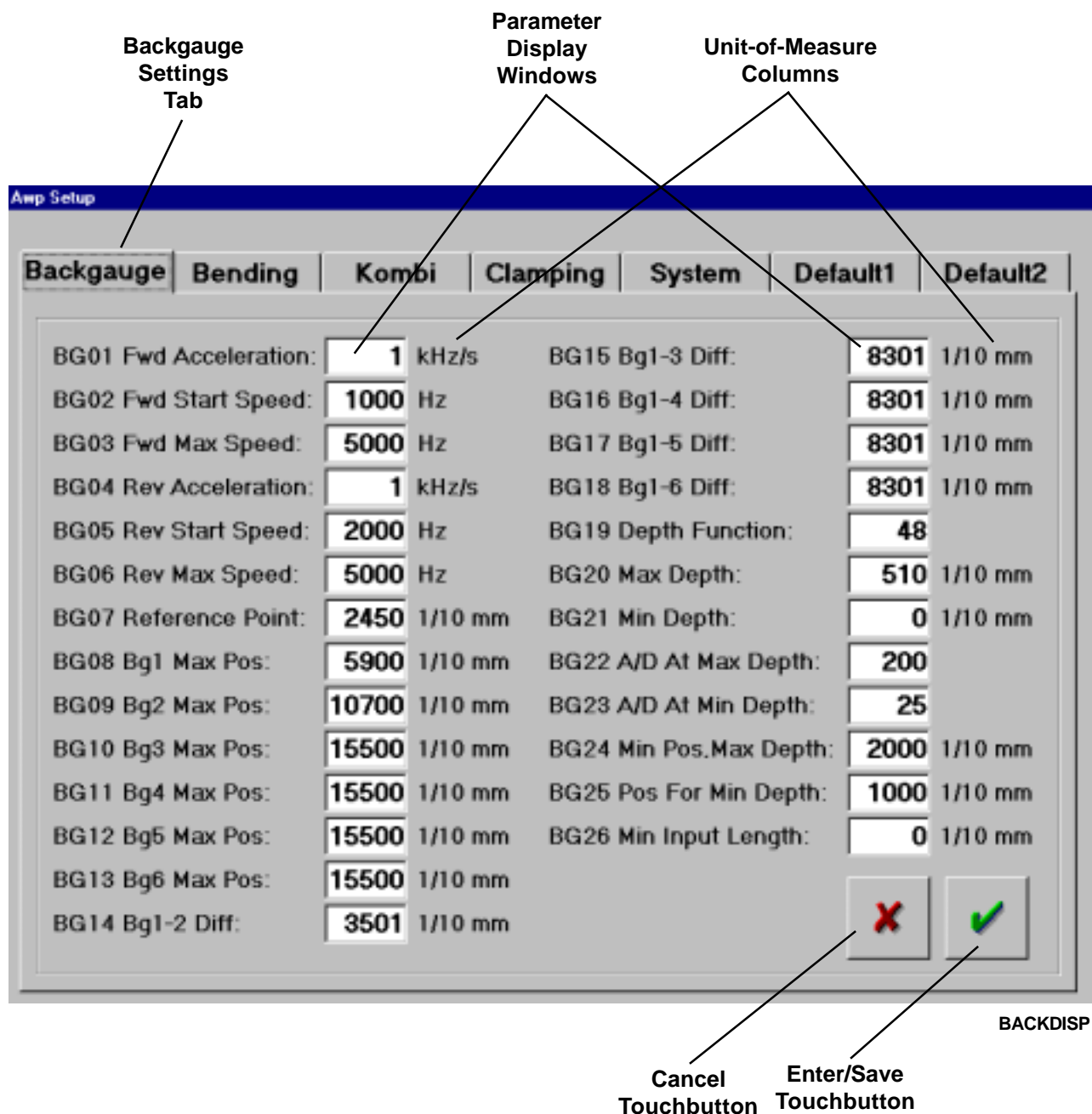


Figure 13-3. Backgauge Settings Screen

BACKGAUGE SETTING SCREEN

The Backgauge Setting Screen contains all the changeable parameters pertaining to the machine backgauge. Changeable parameters appear in the white Parameter Display Windows. Values in these windows may be either a value within a range (in which case the Unit-of-Measure Columns help define the values), or specific numeric values having specific functional meanings. Table 13-1 explains the values appearing in the Parameter Display Windows.

Table 13-1. Backgauge Parameters

Parameter Code	Range or Meaning	Definition
BG01	0 TO 8	The rate at which the backgauge will accelerate to its maximum speed when moving toward the front of the machine.
BG02	75 TO 10000	The initial speed of the backgauge when moving toward the front of the machine.
BG03	75 TO 10000	The maximum speed of the backgauge when moving toward the front of the machine.
BG04	0 TO 8	The rate at which the backgauge will accelerate to its maximum speed when moving toward the rear of the machine.
BG05	75 TO 10000	The initial speed of the backgauge when moving toward the rear of the machine.
BG06	75 TO 10000	The maximum speed of the backgauge when moving toward the rear of the machine.
BG07	2400 TO 2600	The backgauge "home" position setting.
BG08	Maximum	The maximum backgauge position that the first set of fingers will move to.
BG09	Maximum	The maximum backgauge position that the second set of fingers will move to.
BG10	Maximum	The maximum backgauge position that the third set of fingers will move to. If the backgauge has less than three sets of fingers, then this value will be the same as BG09.
BG11	Maximum	The maximum backgauge position that the fourth set of fingers will move to. If the backgauge has less than four sets of fingers, then this value will be the same as BG10.
BG12	Maximum	The maximum backgauge position that the fifth set of fingers will move to. If the backgauge has less than five sets of fingers, then this value will be the same as BG11.
BG13	Maximum	The maximum backgauge position that the sixth set of fingers will move to. If the backgauge has less than six sets of fingers, then this value will be the same as BG12.
BG14	Differential	The difference in the backgauge position from finger one to finger two.
BG15	Differential	The difference in the backgauge position from finger one to finger three. If the backgauge has less than three sets of fingers, then this value will be the same as BG14.
BG16	Differential	The difference in the backgauge position from finger one to finger four. If the backgauge has less than four sets of fingers, then this value will be the same as BG15.
BG17	Differential	The difference in the backgauge position from finger one to finger five. If the backgauge has less than five sets of fingers, then this value will be the same as BG16.
BG18	Differential	The difference in the backgauge position from finger one to finger six. If the backgauge has less than six sets of fingers, then this value will be the same as BG17.

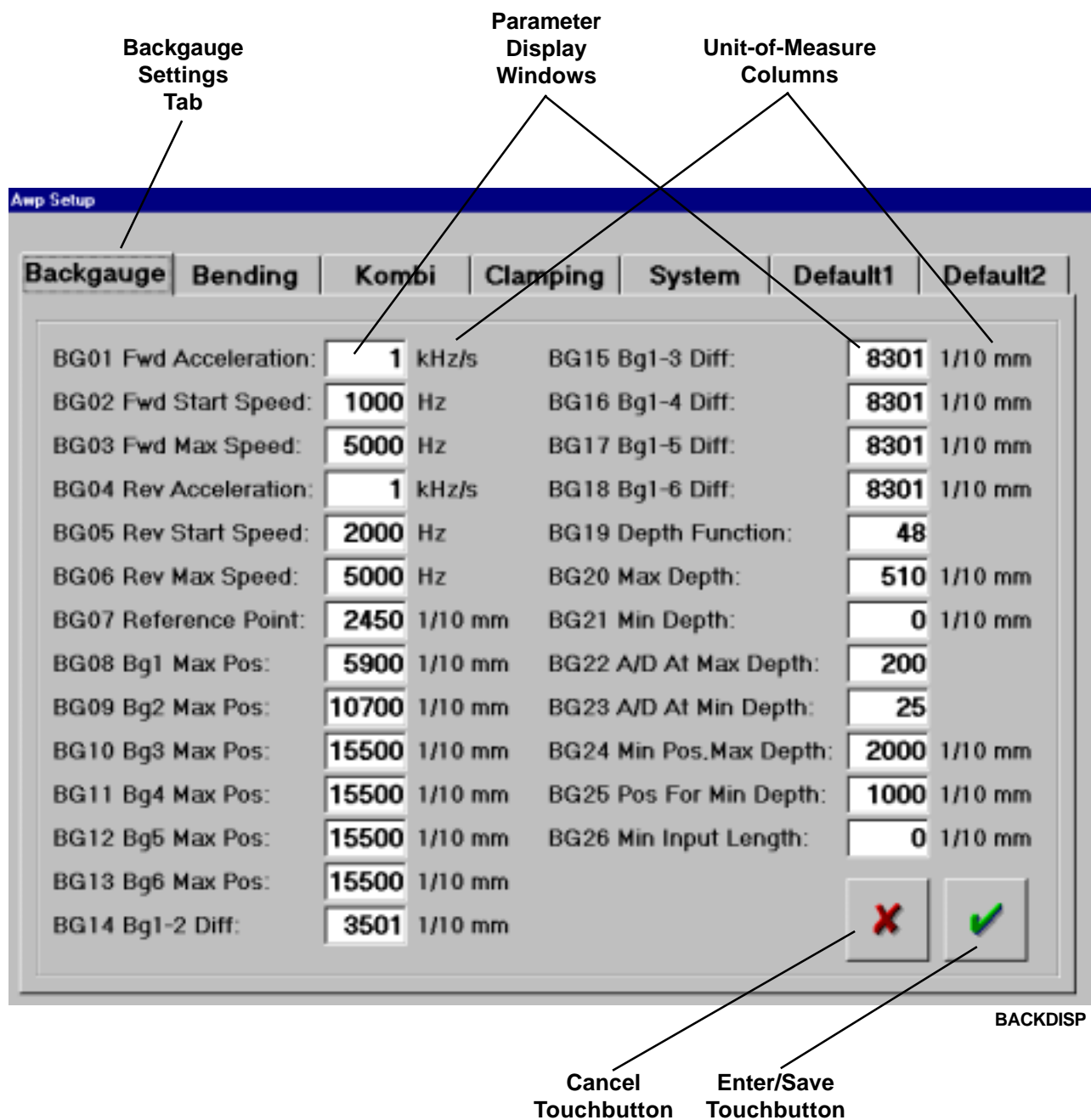


Figure 13-3. Backgauge Settings Screen (continued)

Table 13-1. Backgauge Parameters (continued)

Parameter Code	Range or Meaning	Definition
BG19	48 = No 49 = Yes	This setting is either "ON" or "OFF": normally set to "OFF". When set to "ON", the operator is allowed to program the vertical position of the backgauge. This feature is only effective on those machines equipped with a Multifold backgauge.
BG20	100 to 1000	The lowest vertical position of the backgauge relative to the top of the lower jaw. If BG19 is set to "48" (OFF), then this function is disabled.
BG21	0 to 90	The highest vertical position of the backgauge relative to the top of the lower jaw. If BG19 is set to "48" (OFF), then this function is disabled.
BG22	128 to 255	The linear transducer calibration reading taken from the Diagnostic screen when the backgauge is at its maximum depth. If BG19 is set to "48" (OFF), then this function is disabled.
BG23	0 to 127	The linear transducer calibration reading taken from the Diagnostic screen when the backgauge is at its minimum depth. If BG19 is set to "48" (OFF), then this function is disabled.
BG24	100 to 4000	The minimum forward position allowed by the front backgauge fingers when the backgauge is at its maximum depth. If BG19 is set to "48" (OFF), then this function is disabled.
BG25	100 to 4000	The minimum forward position allowed by the front backgauge fingers when the backgauge is at its minimum depth: must be less than BG24. If BG19 is set to "48" (OFF), then this function is disabled.
BG26	0 to 200	The minimum programmable setting for the front backgauge fingers: normally set to zero "0".

MAKING CHANGES TO BACKGAUGE PARAMETERS

Backgauge parameters can be changed by those authorized to make such changes. Because system security is involved, instructions for making such changes are contained in Section 3, Security.

RETURNING TO THE MAIN SCREEN

To return to the Main Screen, touch the Cancel Touchbutton.

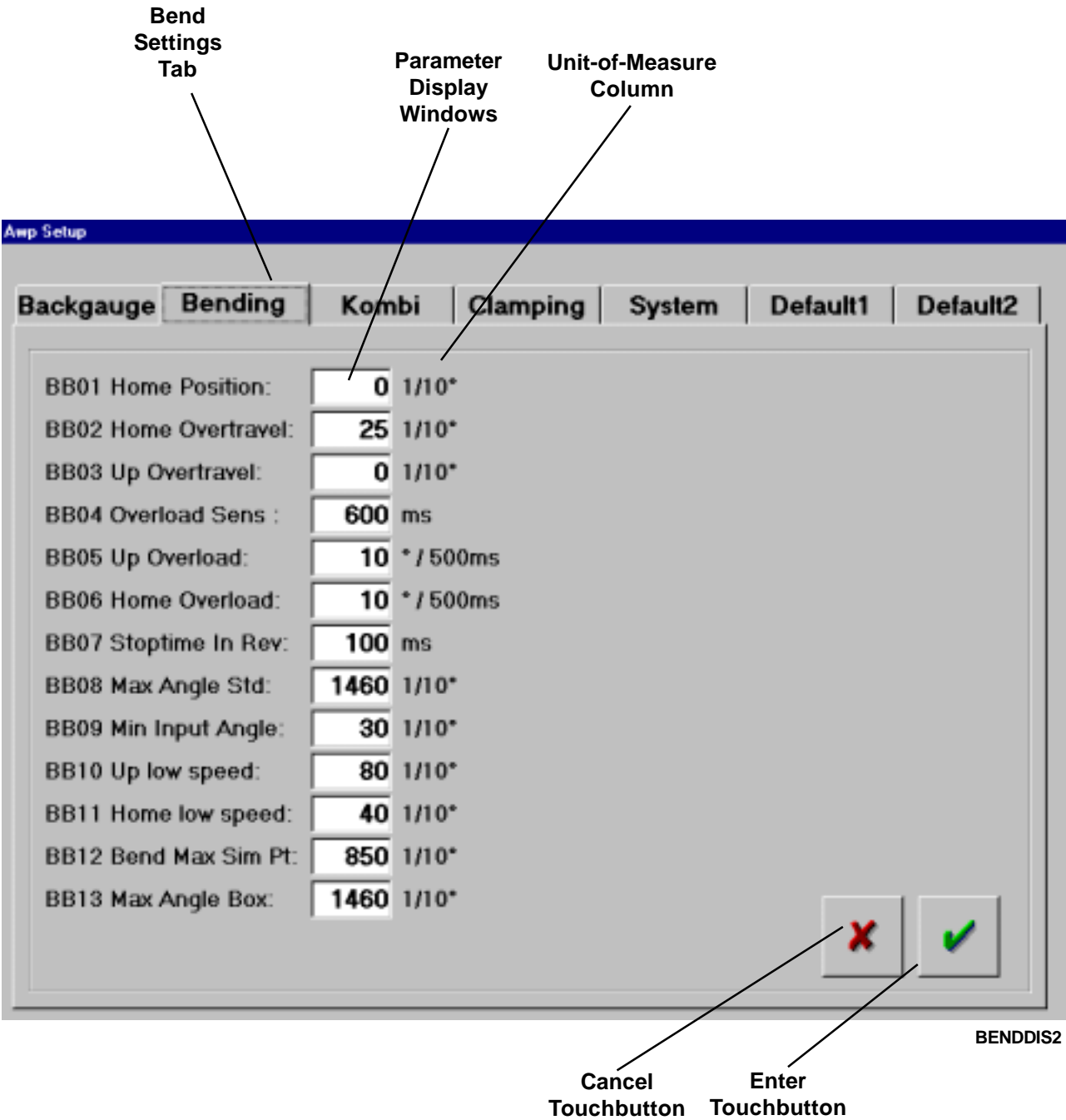


Figure 13-4. Bending Beam Settings Screen

BENDING BEAM SETTINGS SCREEN

The Bending Beam Settings Screen contains all the changeable parameters pertaining to the machine bending beam. Changeable parameters appear in the white Parameter Display Windows. Values in these windows may be either a value within a range (in which case the Unit-of-Measure Columns help define the values), or specific numeric values having specific functional meanings. Table 13-2 explains the values appearing in the Parameter Display Windows.

Table 13-2. Bending Beam Parameters

Parameter Code	Range or Meaning	Definition
BB01	10 to 50	The "home" position for the Bending Beam
BB02	0 to 200	The angle at which power is removed from the bending motor prior to the bending beam reaching its "home" position.
BB03	0 to 200	The angle at which power is removed from the bending motor prior to the bending beam reaching its programmed position. Programmed angles must be greater than this value before the bending beam will move.
BB04	100 to 10000	This is the time that must elapse before any type overload detection will occur, expressed in millisecond: sets the overload sensitivity.
BB05	1 to 100	Sets the amount of error needed within 500 milliseconds before an overload is detected during the upward motion of the bending beam.
BB06	1 to 100	Sets the amount of error needed within 500 milliseconds before an overload is detected during the downward motion of the bending beam.
BB07	50 to 1000	The amount of time that the bending beam will pause after reaching its programmed position before returning "home".
BB08	600 to 1800	The maximum programmed angle allowed with standard tooling.
BB09	0 = Jog Range 10 to 100	The minimum programmed angle allowed: equal to or greater than BB03.
BB10	0 to 300	The angle at which the bending beam will change to a reduced speed prior to reaching the programmed bending angle. This feature is only valid on machines with variable speed drives or hydraulic drives.
BB11	0 to 300	The angle at which the bending beam will change to a reduced speed prior to reaching its "home" position. This feature is only valid on machines with variable speed drives or hydraulic drives.
BB12	0 to 1800	The maximum angle that the bending beam will move to when simulated clamping pressure is activated.
BB13	600 to 1800	The maximum programmed angle allowed with box tooling.

MAKING CHANGES TO BENDING BEAM PARAMETERS

Bending Beam parameters can be changed by those authorized to make such changes. Because system security is involved, instructions for making such changes are contained in Section 3, Security.

RETURNING TO THE MAIN SCREEN

To return to the Main Screen, touch the Cancel Touchbutton.

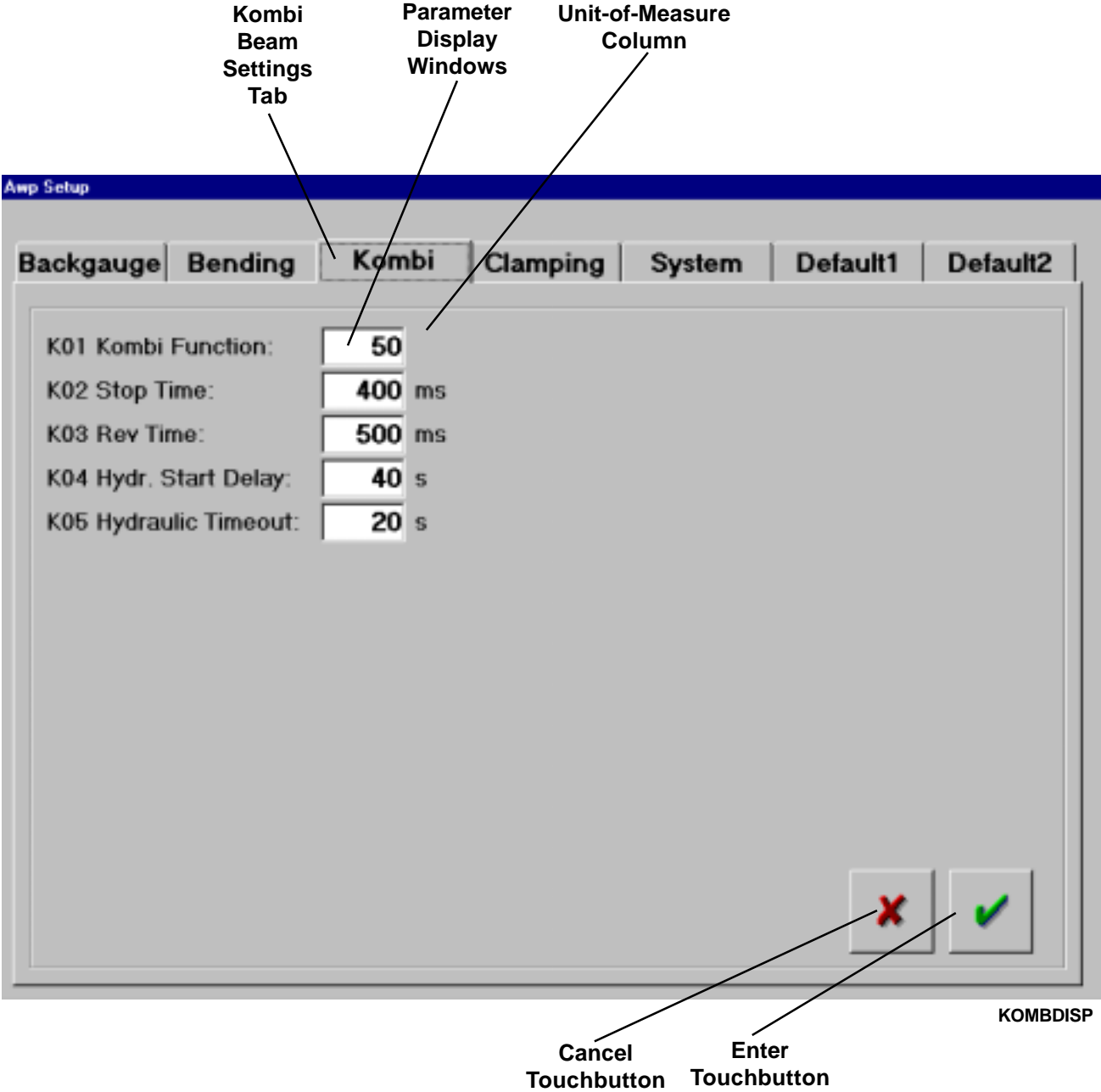


Figure 13-5. Kombi Beam Settings Screen

KOMBI BEAM SETTINGS SCREEN

The Kombi Beam Settings Screen contains all the changeable parameters pertaining to the machine Kombi beam. Changeable parameters appear in the white Parameter Display Windows. Values in these windows may be either a value within a range (in which case the Unit-of-Measure Columns help define the values), or specific numeric values having specific functional meanings. Table 13-3 explains the values appearing in the Parameter Display Windows.

These settings only apply to those folding systems equipped with a rotating Kombi upper beam.

Table 13-3. Kombi Beam Parameters

Parameter Code	Range or Meaning	Definition
K01	48 = No Kombi Beam 49 = MS 50 = MC 51 = HS 52 = HC	This setting identifies whether the machine is equipped with the rotating Kombi beam or not. It also identifies if the Kombi uses a hydraulic locking system (H) or a mechanical locking system (M); and determines the type of control the operator has over the rotation of the beam: single actuation of the footswitch (S), or continuous actuation (C).
K02	10 to 10000	The time that the Kombi beam will continue in its rotation after activating its position switch: minimum setting of 10.
K03	10 to 10000	The time that the Kombi beam will rotate in the reverse direction into the locked position: minimum setting of 10.
K04	1 to 65	The hydraulic pump is activated when the pressure sensor reports a low reading after this amount of time has passed: minimum setting of one second. This setting is only effective on machines equipped with hydraulic locking Kombi beams.
K05	1 to 65	A low pressure warning is reported to the operator after this amount of time has passed when the pressure sensor measures a low reading: minimum setting of one second. Clamping and bending functions on the machine are paused until pressure is restored. This setting is only effective on machines equipped with hydraulic locking Kombi beams.

MAKING CHANGES TO KOMBI BEAM PARAMETERS

Kombi Beam parameters can be changed by those authorized to make such changes. Because system security is involved, instructions for making such changes are contained in Section 3, Security.

RETURNING TO THE MAIN SCREEN

To return to the Main Screen, touch the Cancel Touchbutton.

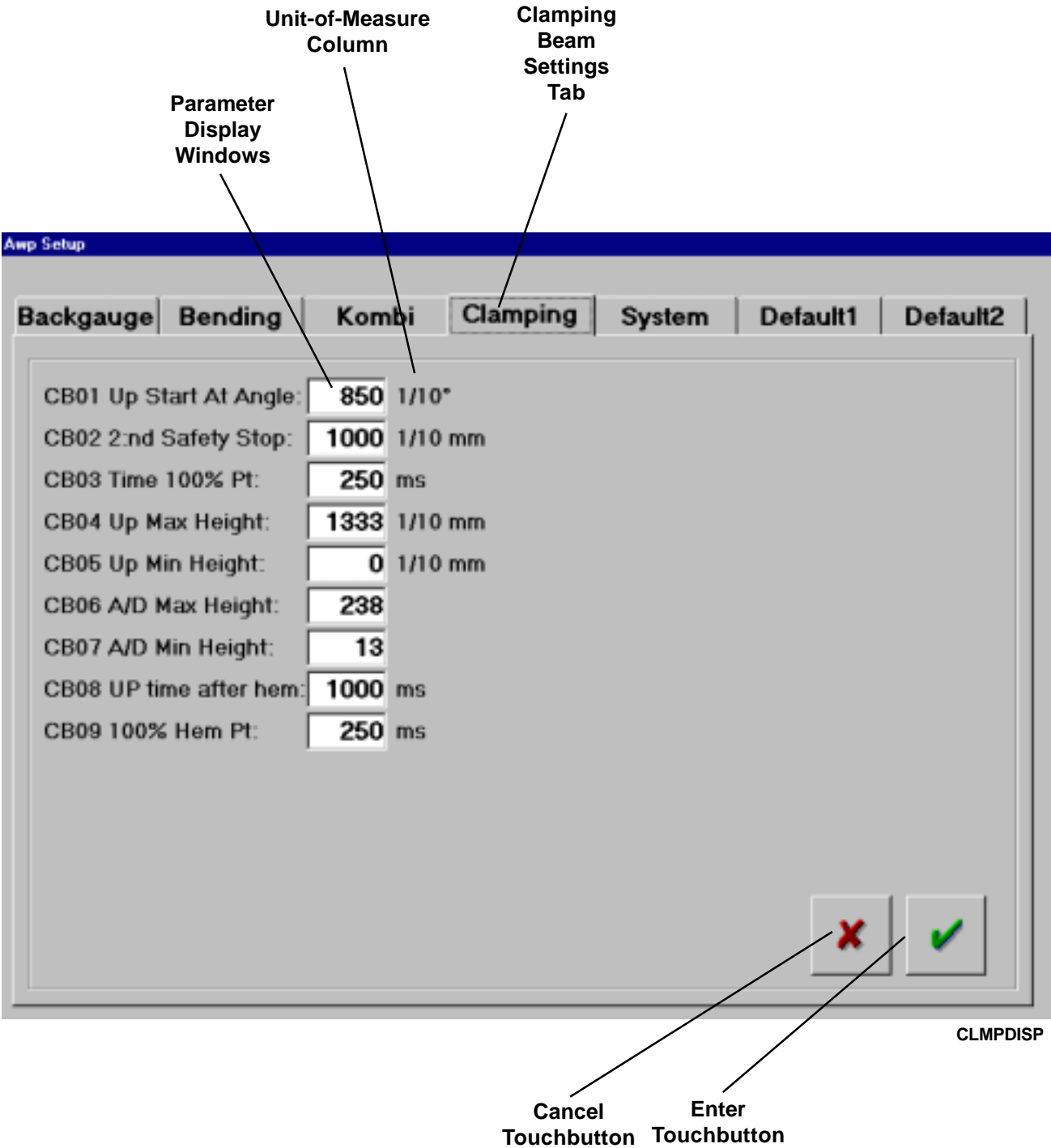


Figure 13-6. Clamping Beam Settings Screen

CLAMPING BEAM SETTINGS SCREEN

The Clamping Beam Settings Screen contains all the changeable parameters pertaining to the machine clamping beam. Changeable parameters appear in the white Parameter Display Windows. Values in these windows may be either a value within a range (in which case the Unit-of-Measure Columns help define the values), or specific numeric values having specific functional meanings. Table 13-4 explains the values appearing in the Parameter Display Windows.

Table 13-4. Clamping Beam Parameters

Parameter Code	Range or Meaning	Definition
CB01	0 to 900	The upper beam will start to raise during the return of the bending beam to its "home" position when the bending beam is at or below this angle.
CB02	0 to 1000	A secondary programmable vertical stop position for the upper jaw at which the upper beam will stop if clamping from a point above this setting. This setting has no function in version 3.1 or earlier Orion software
CB03	10 to 500	The maximum time that can elapse after the pressure switch is activated until the upper beam reaches 100% clamping pressure.
CB04	500 to 3000	The maximum height the upper beam can attain during programmed movement.
CB05	0 to 400	The minimum height the upper beam can attain during programmed movement.
CB06	128 to 255	The linear transducer calibration reading taken from the Diagnostic screen when the upper beam is at its maximum height.
CB07	0 to 127	The linear transducer calibration reading taken from the Diagnostic screen when the upper beam is at its minimum height.
CB08	0 to 2000	The minimum time that the upper beam will move upward after any hem is completely formed.
CB09	10 to 1000	The maximum time that can elapse after the pressure switch is activated until the upper beam reaches 100% hemming pressure.

MAKING CHANGES TO CLAMPING BEAM PARAMETERS

Clamping Beam parameters can be changed by those authorized to make such changes. Because system security is involved, instructions for making such changes are contained in Section 3, Security.

RETURNING TO THE MAIN SCREEN

To return to the Main Screen, touch the Cancel Touchbutton.

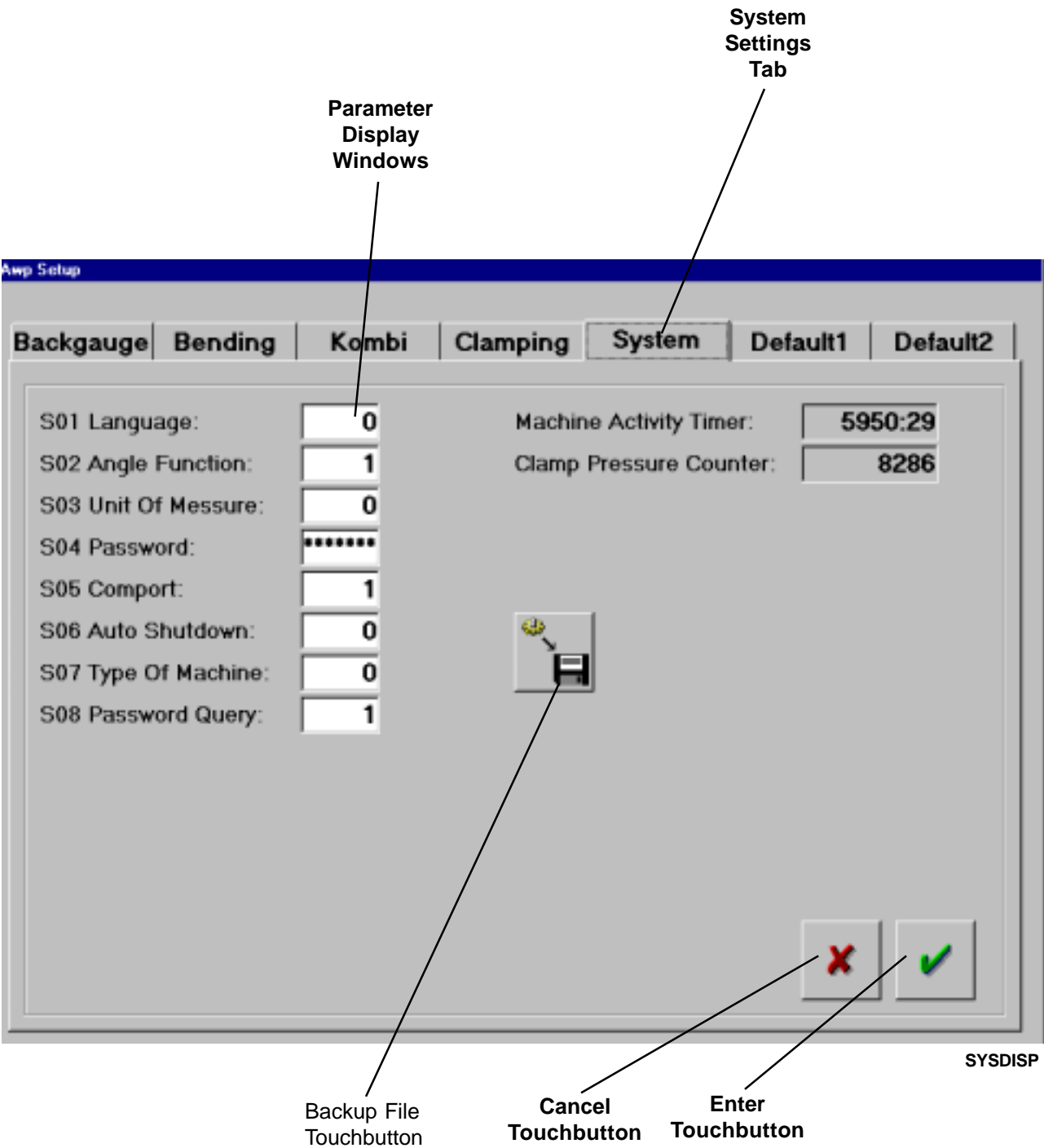


Figure 13-7. System Settings Screen

**SYSTEM
SETTINGS
SCREEN**

The System Settings Screen contains all the changeable parameters pertaining to the machine system itself. Changeable parameters appear in the white Parameter Display Windows. Values in these windows are specific numeric values having specific functional meanings. Table 13-5 explains the values appearing in the Parameter Display Windows.

Table 13-5. System Parameters

Parameter Code	Meaning	Definition
SO1	0 = English 1 = Swedish 2 = Danish 3 = Spanish 4 = Polish	This value sets the displayed language for the Orion software: the default is "0".
SO2	0 = Measured Value 1 = Programmed Value	Selects whether the angle displayed while the bending beam is moving will be the measured value or the programmed value.
SO3	0 = Default Inch 1 = Default Metric 2 = Fixed Inch 3 = Fixed Metric	Sets the default measurement to inch or metric. The measurement may also be set to always display either inch or metric type: the Inch/Metric toggle button is then disabled.
SO4	User Defined String	The system password which must be entered to change any of the Machine Parameters: 255 characters maximum. The password is shown as "*****" for security reasons.
SO5	0 = No Comport 1 thru 16 = Comport No.	Sets the communications port used on the pendant computer for connecting to the ICS controller. When set to zero "0" communications are disabled to the ICS controller: used for remote (office) operation of the Orion software.
SO6	0 = No 1 = Yes	Sets the exit mode for the Orion software when the red "X" is pressed in the Main Screen: a value of zero "0" returns the operator to the Windows desktop; a value of one "1" starts the Windows auto-shutdown sequence when the Orion software is exited.
SO7	0 =Autobrake 1 = Automax	Identifies the machine on which the Orion software is being used.
SO8	0 = Don't Ask 1 = Ask	Sets the system to permit file saving without a password, or to ask if a password is wanted when the file is saved.

**BACKUP FILE
TOUCHBUTTON**

The Backup File Touchbutton in the System Settings Screen is used to copy key system files to a floppy disk. Press the Backup File Touchbutton to bring up the Backup Instruction Pop-Up Display shown in Figure 13-8.

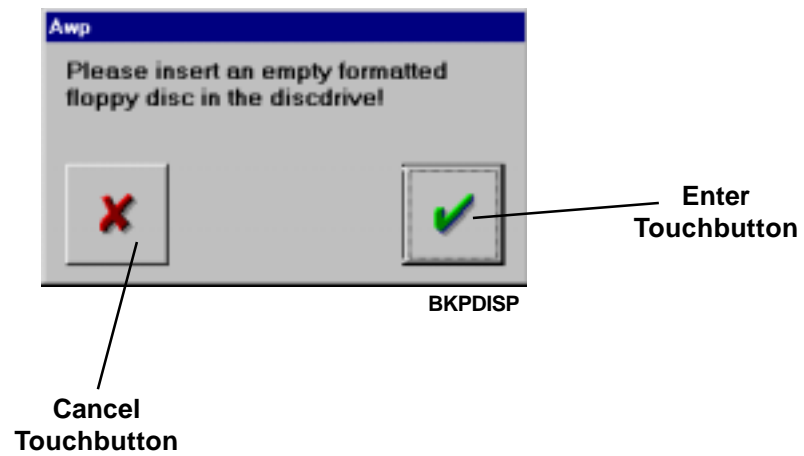


Figure 13-8. Backup Instruction Pop-Up Display

**BACKING UP
SYSTEM FILES**

The Orion software will download the system setup file, the current machine activity log file, and the current language file to the disk. The disk can be used to diagnose any problems, or to restore the setup file should it become damaged.

When prompted by the Backup Instruction Pop-Up Display, place a blank 3.5-inch diskette in the floppy drive of the computer. Touch the Enter Touchbutton in the pop-up display, and the files will be copied. When copying is complete, the pop-up display will disappear, leaving the System Settings Screen visible.

Cancel the backup request by pressing the Cancel Touchbutton on the pop-up display.

**MAKING
CHANGES TO
SYSTEM
PARAMETERS**

System parameters can be changed by those authorized to make such changes. Because system security is involved, instructions for making such changes are contained in Section 3, Security.

**RETURNING
TO THE MAIN
SCREEN**

To return to the Main Screen, touch the Cancel Touchbutton.

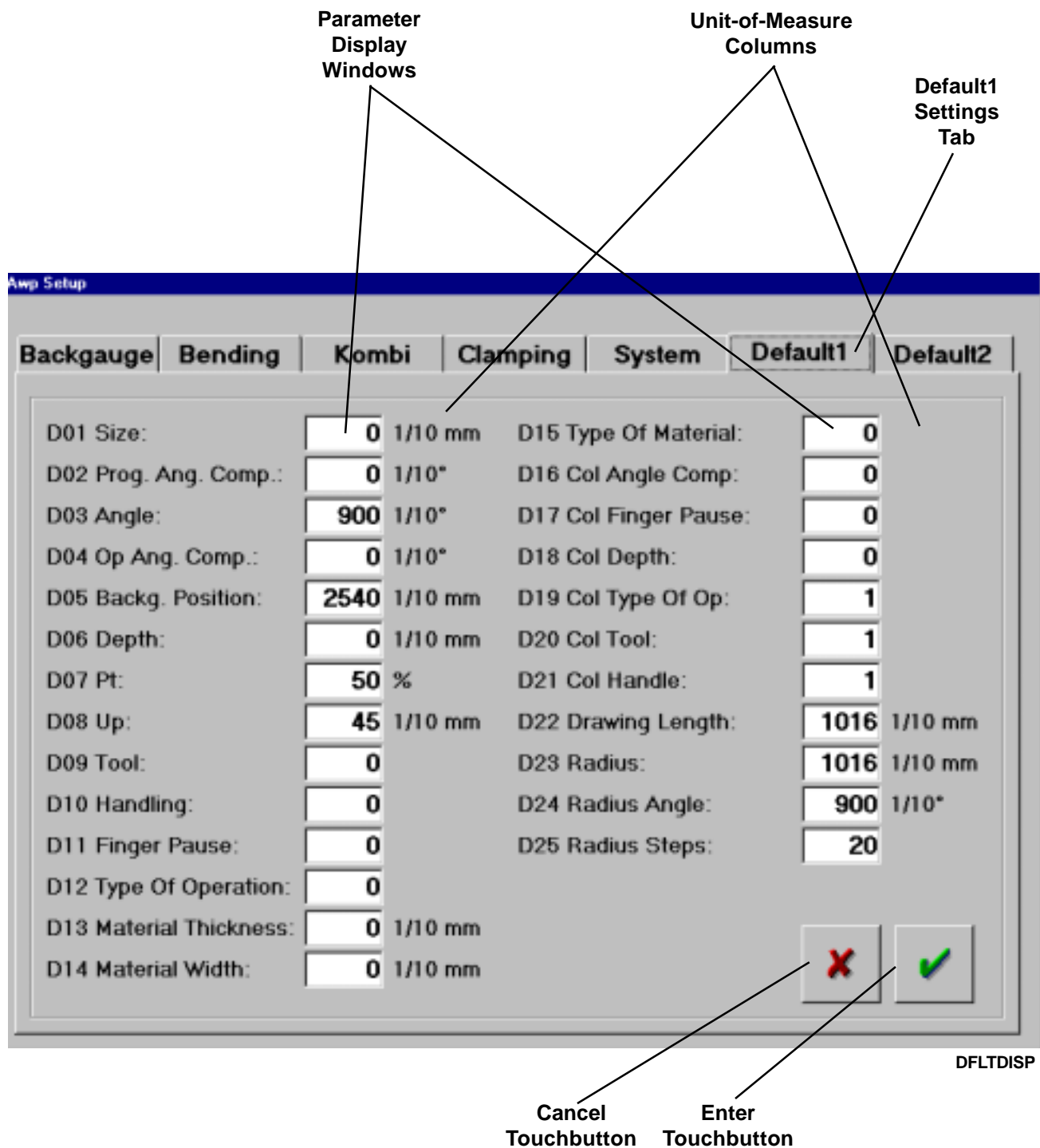


Figure 13-9. Default1 Settings Screen

DEFAULT1 SETTINGS SCREEN

The Default1 Settings Screen contains all the changeable default values which appear on the various screens as operation or programming progresses. The default values appear in the white Parameter Display Windows. Values in these windows are specific dimensional values, or they are numeric values having specific functional meanings. Table 13-6 explains the values appearing in the Parameter Display Windows.

Table 13-6. System Default Values

Default Value Code	Range or Meaning	Definition
D01	0 Min.	The default material blank size.
D02	-200 to +200	The default angle compensation for the entire part program.
D03	BB09 to BB08 or BB13	The default angle for each operation in the part program. (Refer to Bending Settings.)
D04	-200 to +200	The default angle compensation for each operation in the part program.
D05	BG26 to BG18	The default backgauge position for each operation in the part program. (Refer to Backgauge Settings.)
D06	BG21 to BG22	The default depth position for the backgauge for each operation in the part program. This setting is only effective on machines equipped with a Multifold backgauge. (Refer to Backgauge Settings.)
D07	0 to 100	The default clamping pressure for each operation in the part program.
D08	CB05 to CB04	The default open height between the clamp jaws at the start and end of each operation in the part program. (Refer to Clamping Beam Settings.)
D09	0 = Standard 1 = Box	The default tooling position for the Kombi beam for each operation in the part program. This setting is only effective on machines equipped with the rotating Kombi beam.
D10	0 = None 1 = FlipF 2 = Flip 3 = R90L 4 = R90R 5 = R180 6 = FR90L 7 = FR90	The default material handling type for each operation in the part program. (Refer to Figure 8-8 in Section 8, Operation, for an explanation of the codes in the "Meaning" Column.)
D11	0 = No 1 = Yes	The default setting to pause the backgauge motion and finger positioning for each operation in the part program.
D12	0 = Norm 1 = Bump 2 = Wing 3 = OHem 4 = CHem 5 = THem	The default type of bending being performed for each operation in the part program. (Refer to the information for Figure 10-17 in Section 10, Manual Programming, for an explanation of the codes in the "Meaning" Column.)
D13	No Value	The default material thickness for each part program. This setting has no function in version 3.1 or earlier Orion software.
D14	No Value	The default material width for each part program. This setting has no function in version 3.1 or earlier Orion software.
D15	No Value	The default bend angle compensation table for each part program. The default may not be set in version 3.1 or earlier Orion software.

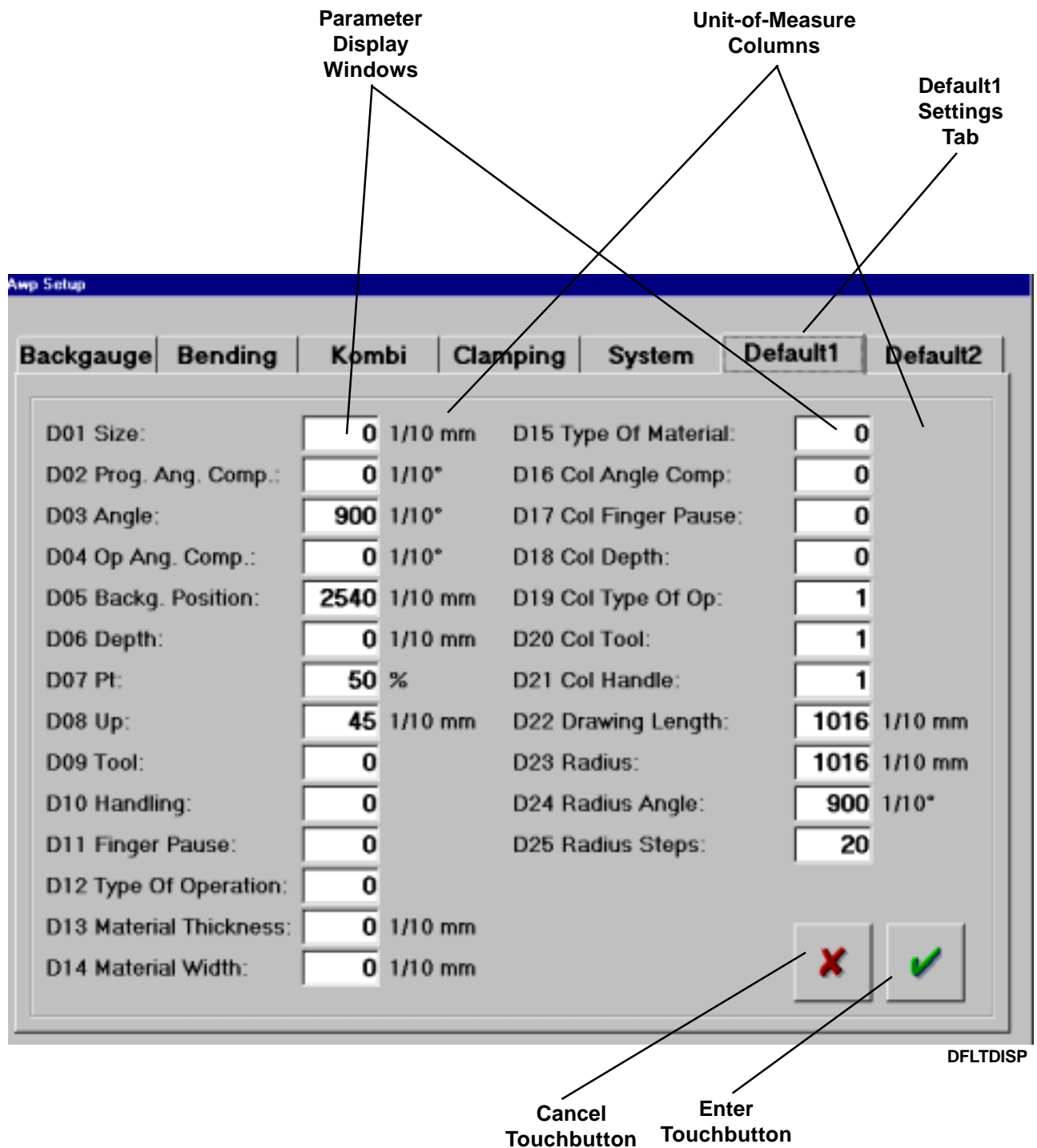


Figure 13-9. Default1 Settings Screen (continued)

Table 13-6. System Default Values (continued)

Default Value Code	Range or Meaning	Definition
D16	0 = Hide 1 = Show	Sets whether this column is displayed or not when the Run/Programming Screen is accessed for a new part program.
D17	0 = Hide 1 = Show	Sets whether this column is displayed or not when the Run/Programming Screen is accessed for a new part program.
D18	0 = Hide 1 = Show	Sets whether this column is displayed or not when the Run/Programming Screen is accessed for a new part program.
D19	0 = Hide 1 = Show	Sets whether this column is displayed or not when the Run/Programming Screen is accessed for a new part program.
D20	0 = Hide 1 = Show	Sets whether this column is displayed or not when the Run/Programming Screen is accessed for a new part program.
D21	0 = Hide 1 = Show	Sets whether this column is displayed or not when the Run/Programming Screen is accessed for a new part program.
D22	0 Min.	The default line length for each line segment in a new part profile drawing.
D23	0 Min.	The default radius size for each radius bend in a new part profile drawing.
D24	0 Min.	The default radius angle for each radius bend in a new part profile drawing.
D25	3 Min.	The default radius steps for each radius bend in a new part profile drawing.

MAKING CHANGES TO SYSTEM DEFAULT VALUES

System Default Values can be changed by those authorized to make such changes. Because system security is involved, instructions for making such changes are contained in Section 3, Security.

RETURNING TO THE MAIN SCREEN

To return to the Main Screen, touch the Cancel Touchbutton.

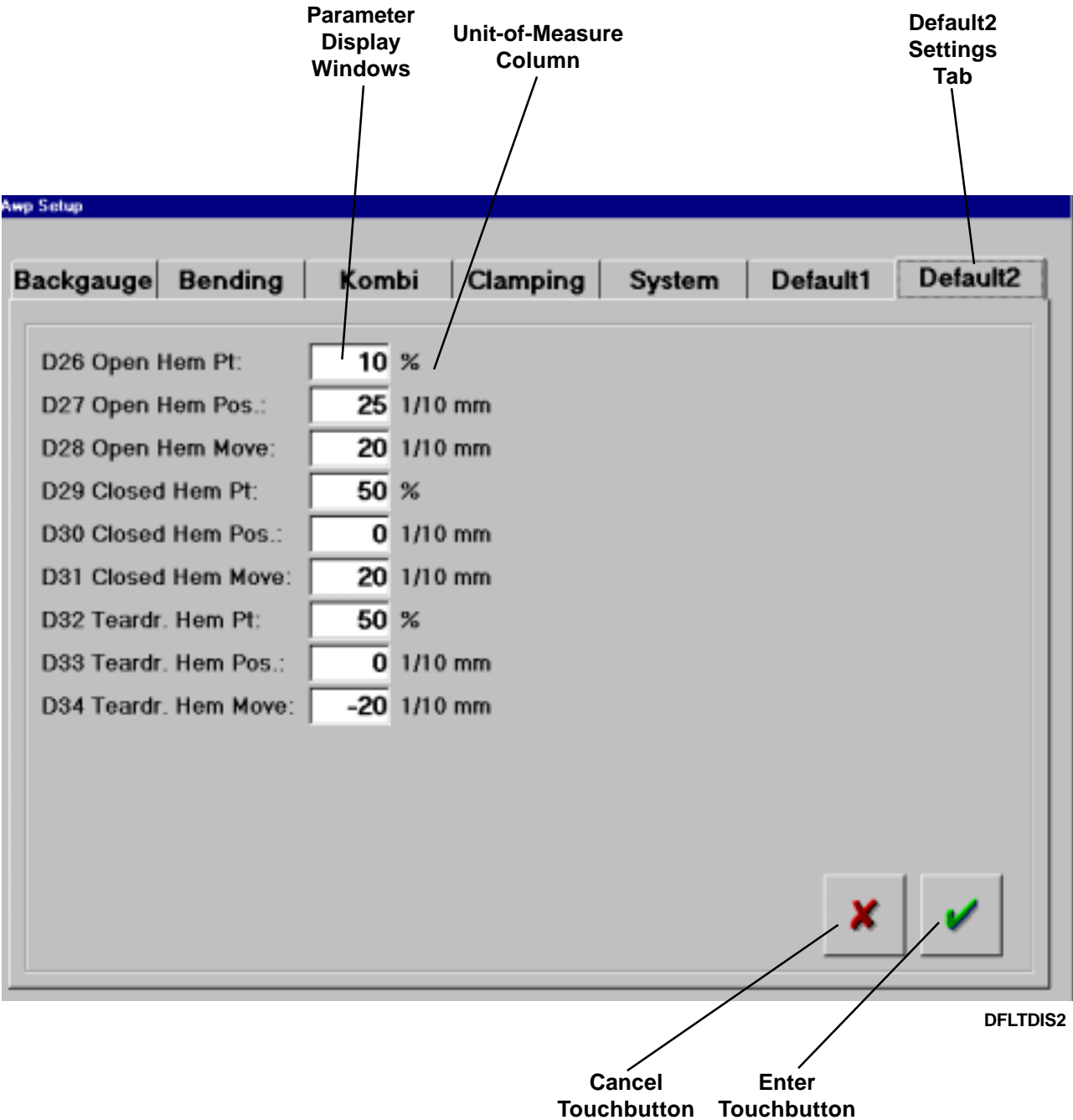


Figure 13-10. Default2 Settings Screen

DEFAULT2 SETTINGS SCREEN

The Default2 Settings Screen is a continuation of the Default1 Settings Screen which contains additional changeable default values. All the values in the Default2 Settings Screen pertain to values for hems.

Table 13-6. System Default Values (continued)

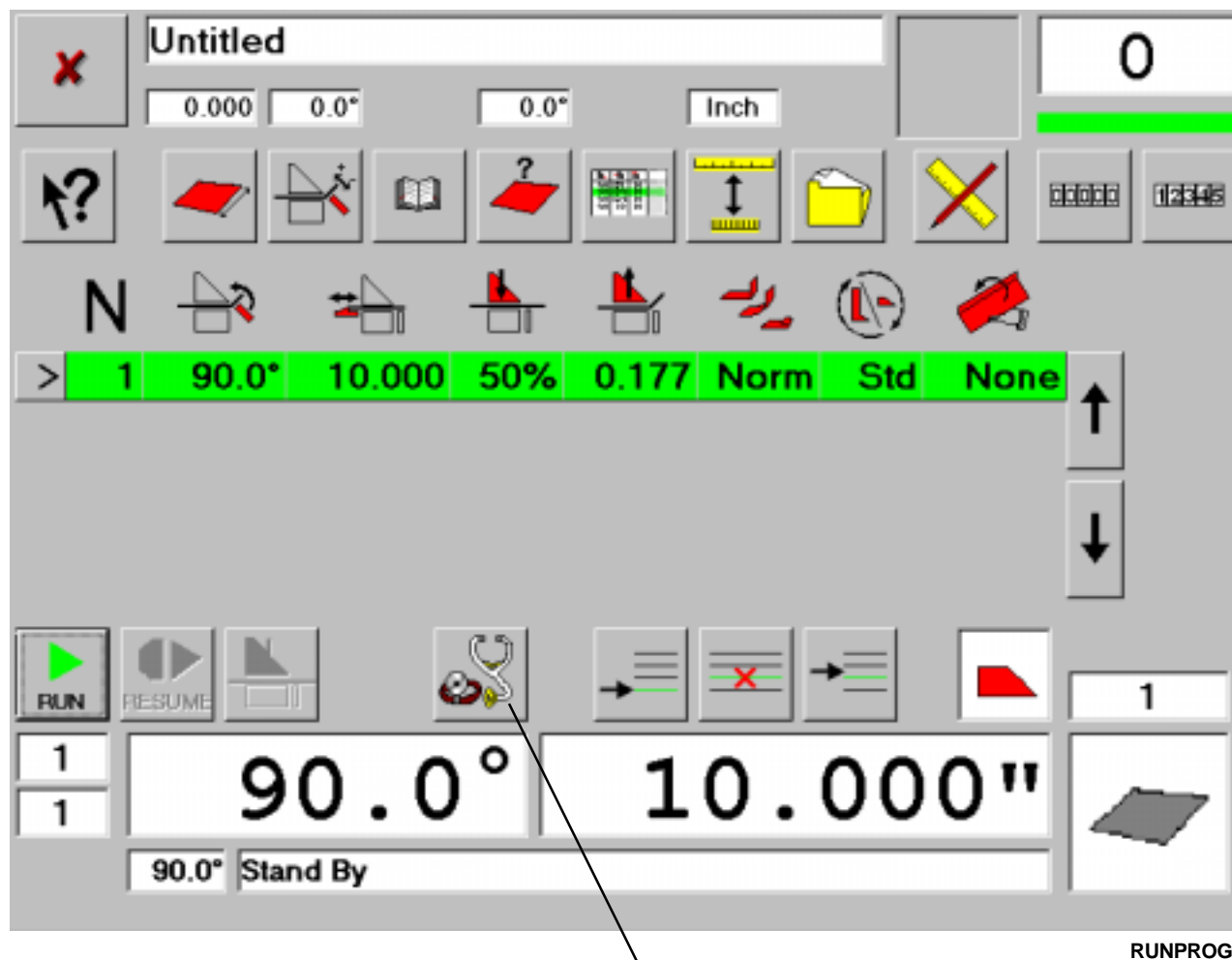
Default Value Code	Range or Meaning	Definition
D26	0 to 100	The default clamping pressure used during the formation of an open hem
D27	CB05 to CB04	The default open height of the clamp jaws at the end of the formation operation for an open hem. (Refer to Clamping Beam Settings.)
D28	0 to 100	The default repositioning of the backgauge prior to forming an open hem.
D29	0 to 100	The default clamping pressure used during the formation of a closed hem
D30	CB05 to CB04	The default open height of the clamp jaws at the beginning of the formation operation for a closed hem. (Refer to Clamping Beam Settings.)
D31	0 to 100	The default repositioning of the backgauge prior to forming a closed hem.
D32	0 to 100	The default clamping pressure used during the formation of a teardrop hem
D33	CB05 to CB04	The default open height of the clamp jaws at the beginning of the formation operation for a teardrop hem. (Refer to Clamping Beam Settings.)
D34	0 to 100	The default repositioning of the backgauge prior to forming a teardrop hem.

MAKING CHANGES TO SYSTEM DEFAULT VALUES

System Default Values can be changed by those authorized to make such changes. Because system security is involved, instructions for making such changes are contained in Section 3, Security.

RETURNING TO THE MAIN SCREEN

To return to the Main Screen, touch the Cancel Touchbutton.



Diagnostics
Touchbutton

Figure 14-1. Run/Programming Screen

SECTION 14

DIAGNOSTICS

Machine diagnostics are used by machine technicians to monitor and troubleshoot machine functions. The diagnostic screens are shown in Figures 14-2 and 14-3.

To access the diagnostics screens, touch the Diagnostics Touchbutton on the Run/Programming Screen shown in Figure 14-1.

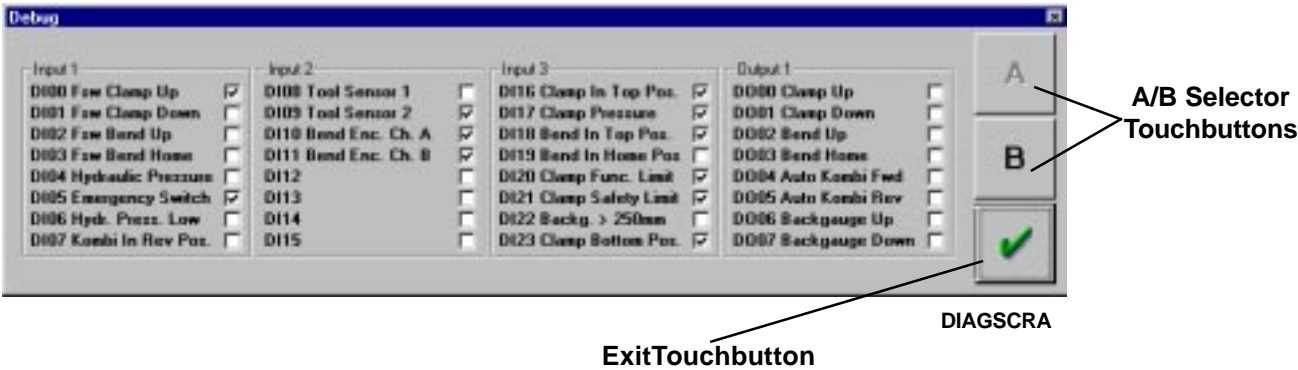


Figure 14-2. Diagnostic Screen A

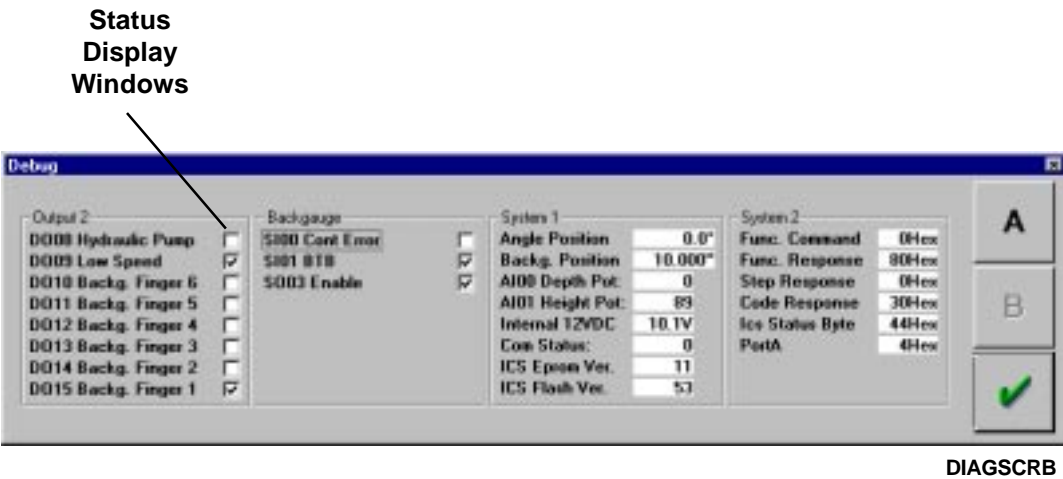


Figure 14-3. Diagnostic Screen B

DIAGNOSTIC SCREENS

There are two diagnostic screens, labeled “A” and “B”. These are shown in Figures 14-2 and 14-3.

The Status Display Windows on Diagnostic Screen A show relay closures. If there is no check mark in the window, the corresponding relay is open. Closed relays are represented by check marks.

The Status Display Windows on Diagnostic Screen B show a combination of relay closures and analog numeric values. As with Screen A, check marks represent relay closures.

Toggle between the two screens by touching the A/B Selector Touchbuttons. The touchbutton for the visible screen is “greyed out”, while the touchbutton for the screen not seen is “highlighted”.

To return to the Run/Programming Screen, touch the Acknowledgment Touchbutton.

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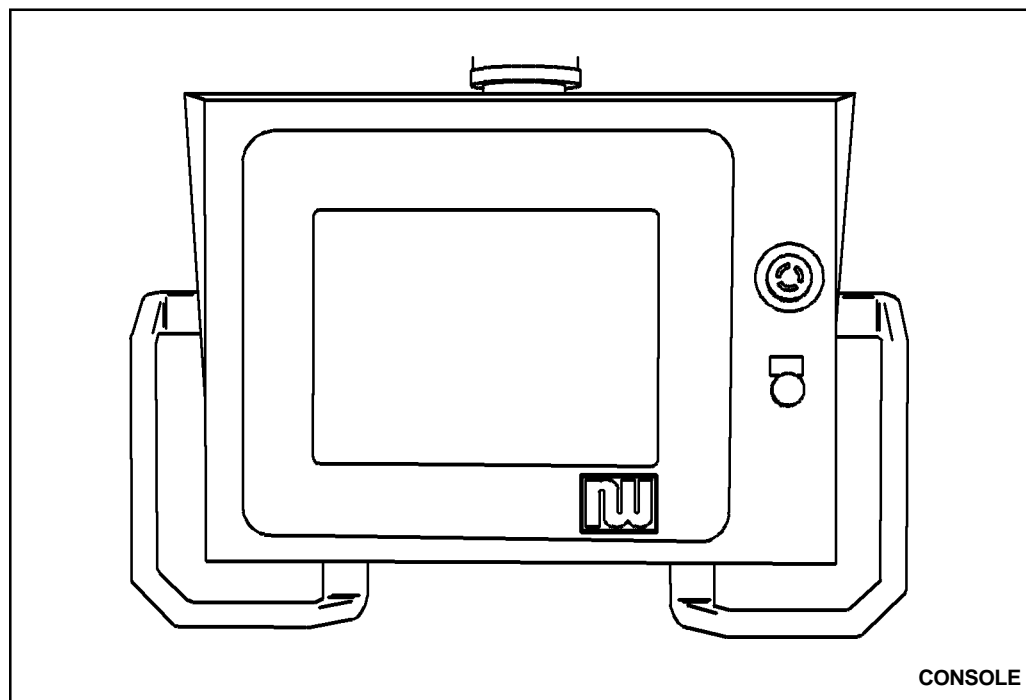
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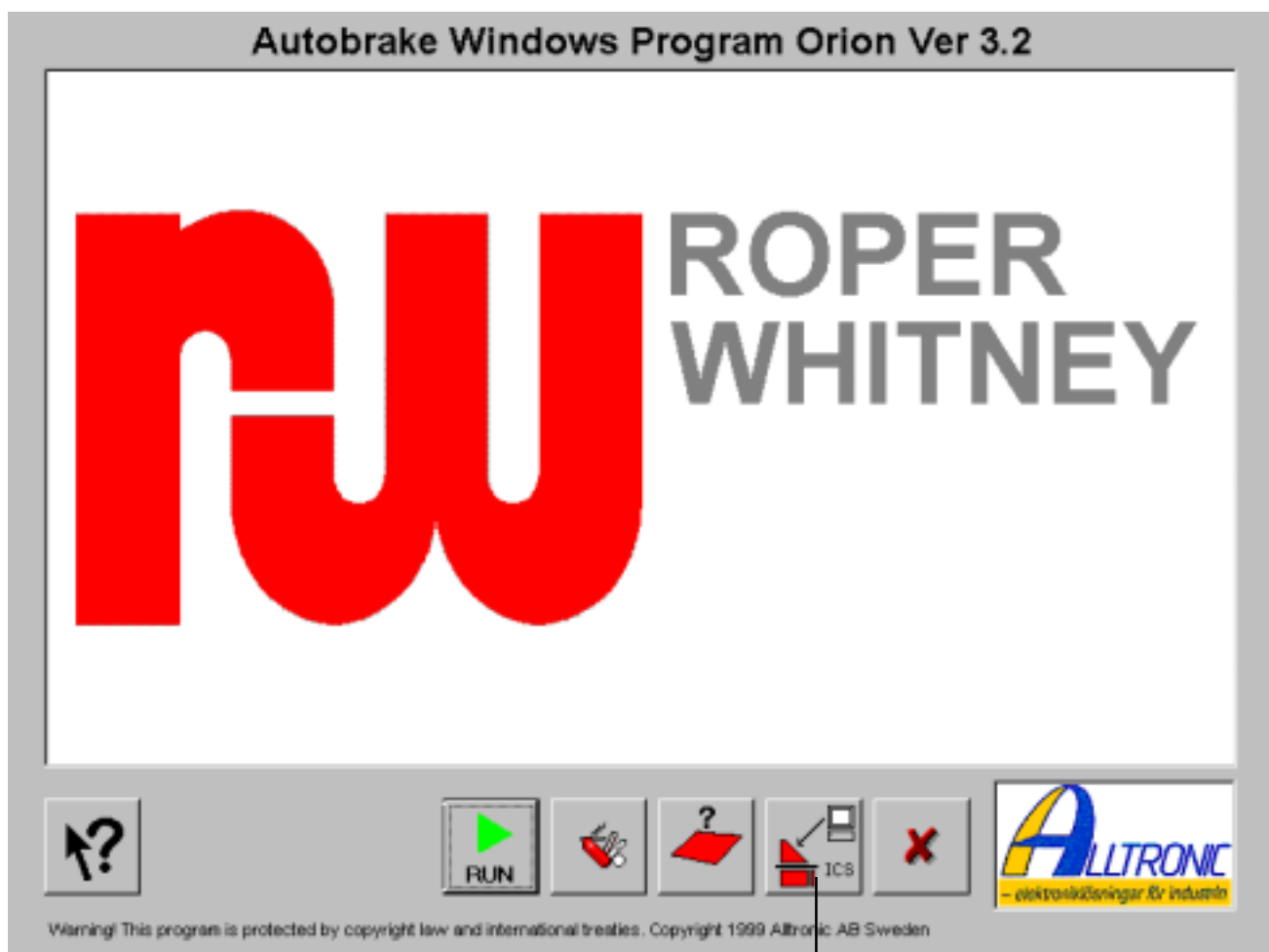
ORION CONTROL SYSTEM

Appendix A Upgrading the ICS



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MAINSCR

ICS
Software
Download
Touchbutton

Figure A-1. Orion Control System Mainscreen

APPENDIX A

UPGRADING THE ICS

From time to time it may be necessary to upgrade the machine ICS. This generally is the case when a power failure or machine malfunction has somehow corrupted the program base contained within the ICS.

The ICS upgrade must be performed by a machine technician. It should be performed whenever the ICS is suspected of malfunctioning, before any additional bending is performed.

Shut down the machine according to the instructions contained in Section 9, Shutdown, of the Orion Control system Technical Manual.

Restart the machine and the control system computer according to the instructions contained in Section 5, Start-Up, of the Orion Control system Technical Manual.

When the Main Screen, shown in Figure A-1 appears, touch the Software Download Touchbutton. The system will ask for the system password.

Enter the password. The Select File Display, Shown in Figure A-2 will appear.

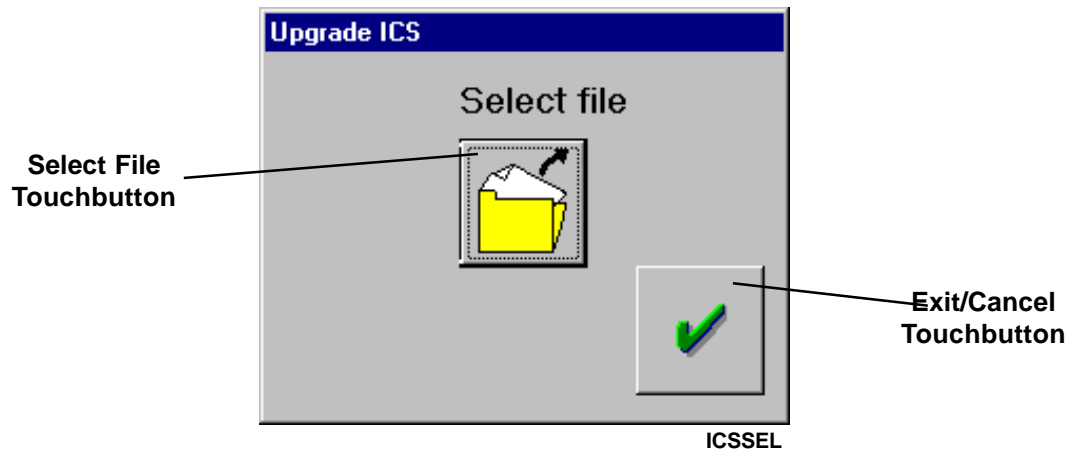


Figure A-2. Select File Display

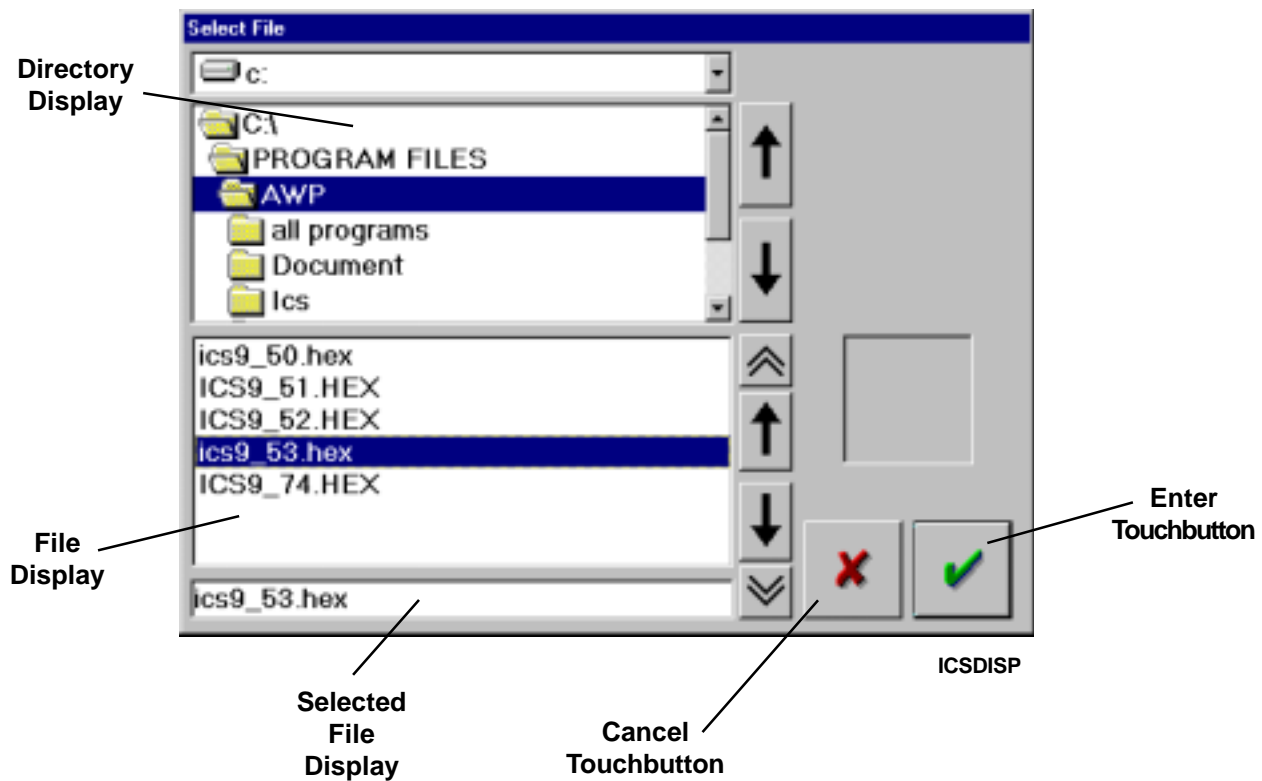


Figure A-3. ICS File Selection Display

When the Select File Display appears, press the Select File Touchbutton. The ICS File Selection Display (Figure A-3) will appear.

ICS Upgrade Files are contained in the **AWP** Directory, and are identified by the **.HEX** extension after the file name.

Touch the **AWP** Directory in the Directory Display to highlight it. The **.HEX** files will appear in the File Display.

Touch the appropriate **.HEX** file to highlight it. It will appear in the Selected File Display. If the correct **.HEX** file is not known, contact Roper Whitney.

If an incorrect file name appears in the Selected File Display, touch the Cancel Touchbutton to return to the Select File Display.

When the correct file name appears in the Selected File Display, touch the Enter Touchbutton to begin downloading the file to the ICS (see Figure B-4).

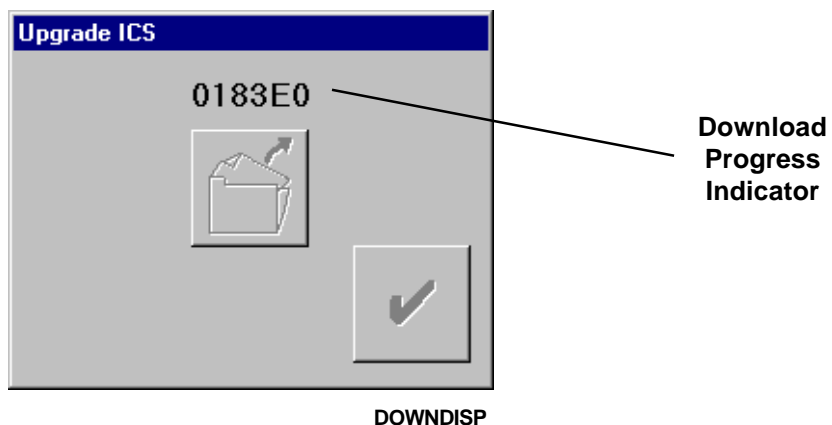


Figure A-4. Download Progress Indicator

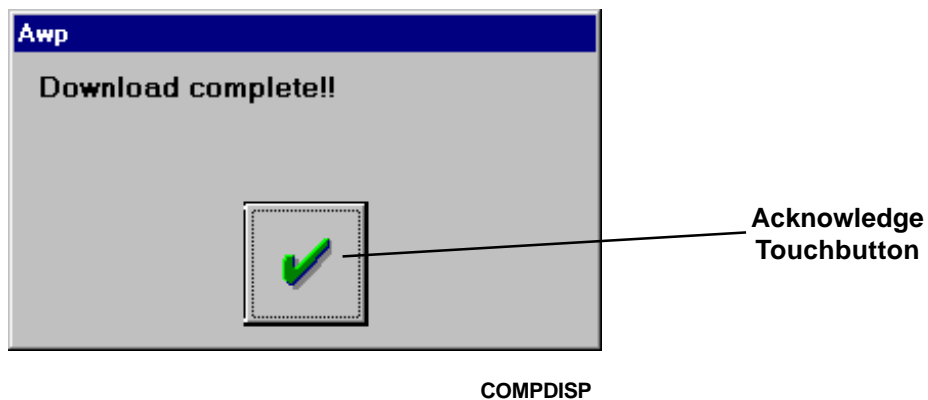


Figure A-5. Download Completed Display

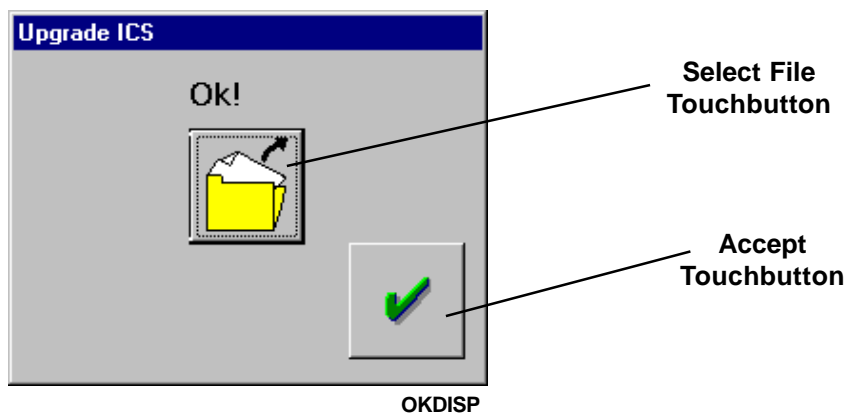


Figure A-6. Accept Download Display

During the download process, a series of HEX numbers will appear over the Select Touchbutton in the Select File Display (see Figure A-4).

When the downloading is completed, the ICS has been upgraded, and the Download Completed Display (Figure A-5) appears. Touch the Acknowledge Touchbutton to bring up the Accept Download Display.

When the Accept Download Display appears, you can either download a different upgrade, or accept the upgrade already downloaded.

If you wish to download a different upgrade, touch the Select File Touchbutton. Figure A-3 appears and the upgrade process can be repeated.

If the upgrade process is acceptable, touch the Accept Download Touchbutton to return to the Main Screen (Figure A-1). The machine is now ready to be operated.

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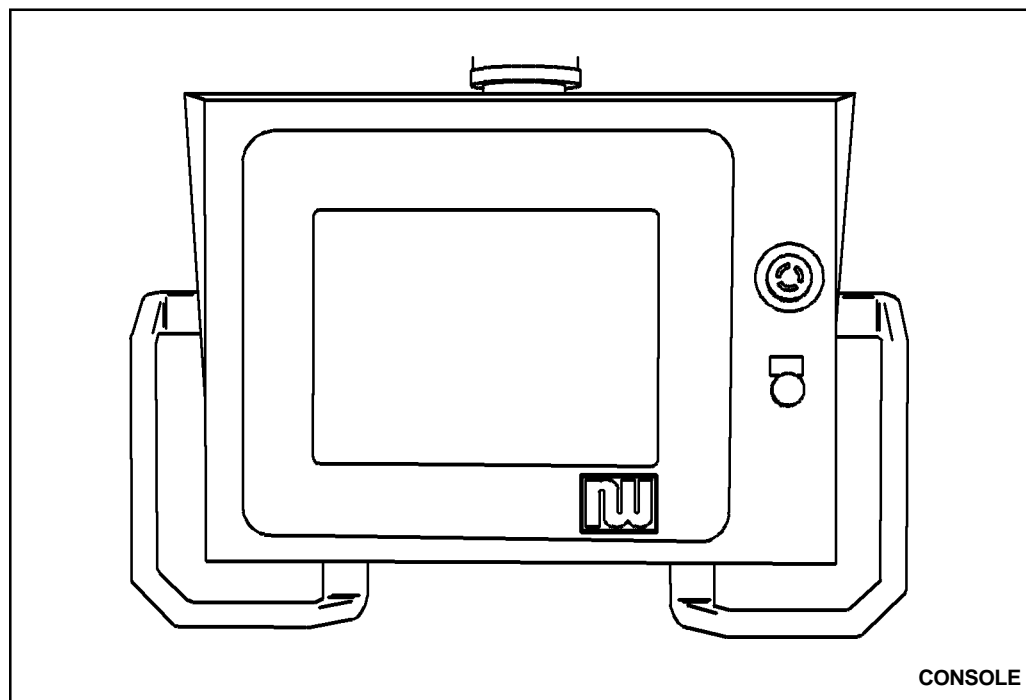
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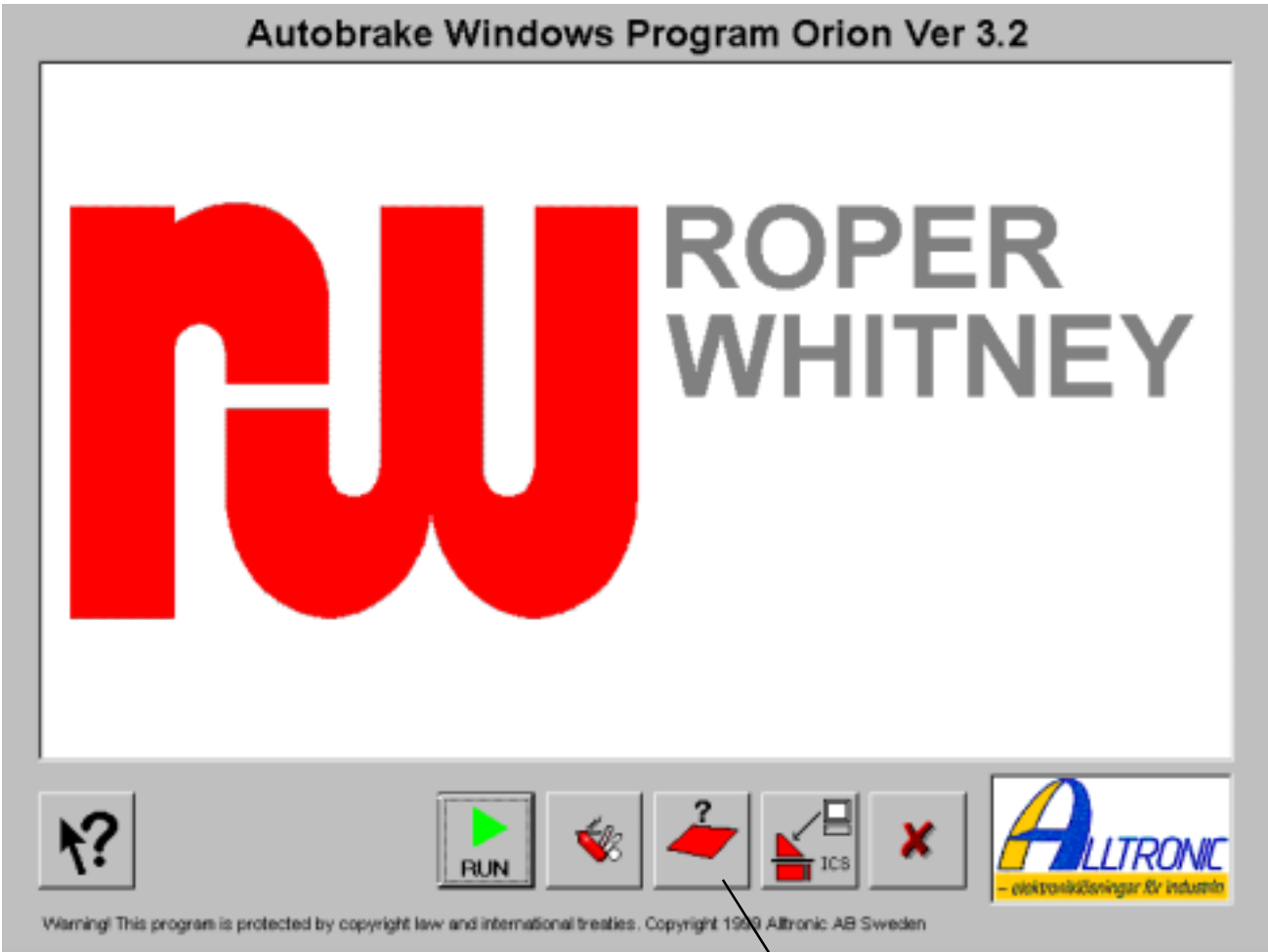
ORION CONTROL SYSTEM

Appendix B Creating Angle Compensation Tables



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MAINSR

Angle
Compensation
Tables
Touchbutton

Figure B-1. Orion Control System Mainscreen

TABLE OF CONTENTS

Getting Started	3
Angle Compensation Tables Screen	5
Creating and Angle Compensation Table	7
Entering Angle Compensation Data	9
Deleting an Angle Comensation Table	13

APPENDIX B

ANGLE COMPENSATION TABLES

GETTING STARTED

Angle Compensation Tables take the place of general angle compensation values. Like the general angle compensation values, they are added to the programmed value of the specific bend. They are developed by testing various materials, taking into account width and thickness being bent.

Because so many combinations of size and material exist, it is not possible for Roper Whitney to provide Angle Compensation Tables suitable for use by all customers. Therefore, no Angle Compensation Tables are supplied with the machine; it is left to the owner of the equipment to develop these tables.

When Angle Compensation Tables are created, they are stored on the system hard drive. Any number of tables may be stored, thus enabling the machine owner to develop a complete set of tables specifically designed to support the manufacturing processes he uses.

Angle Compensation Tables may also be deleted from the hard drive when they are no longer needed.

To create or remove an Angle Compensation Table, touch the Angle Compensation Tables Touchbutton on the Orion system Main Screen. This will bring up the Angle Compensation Tables Screen shown in Figure B-2.

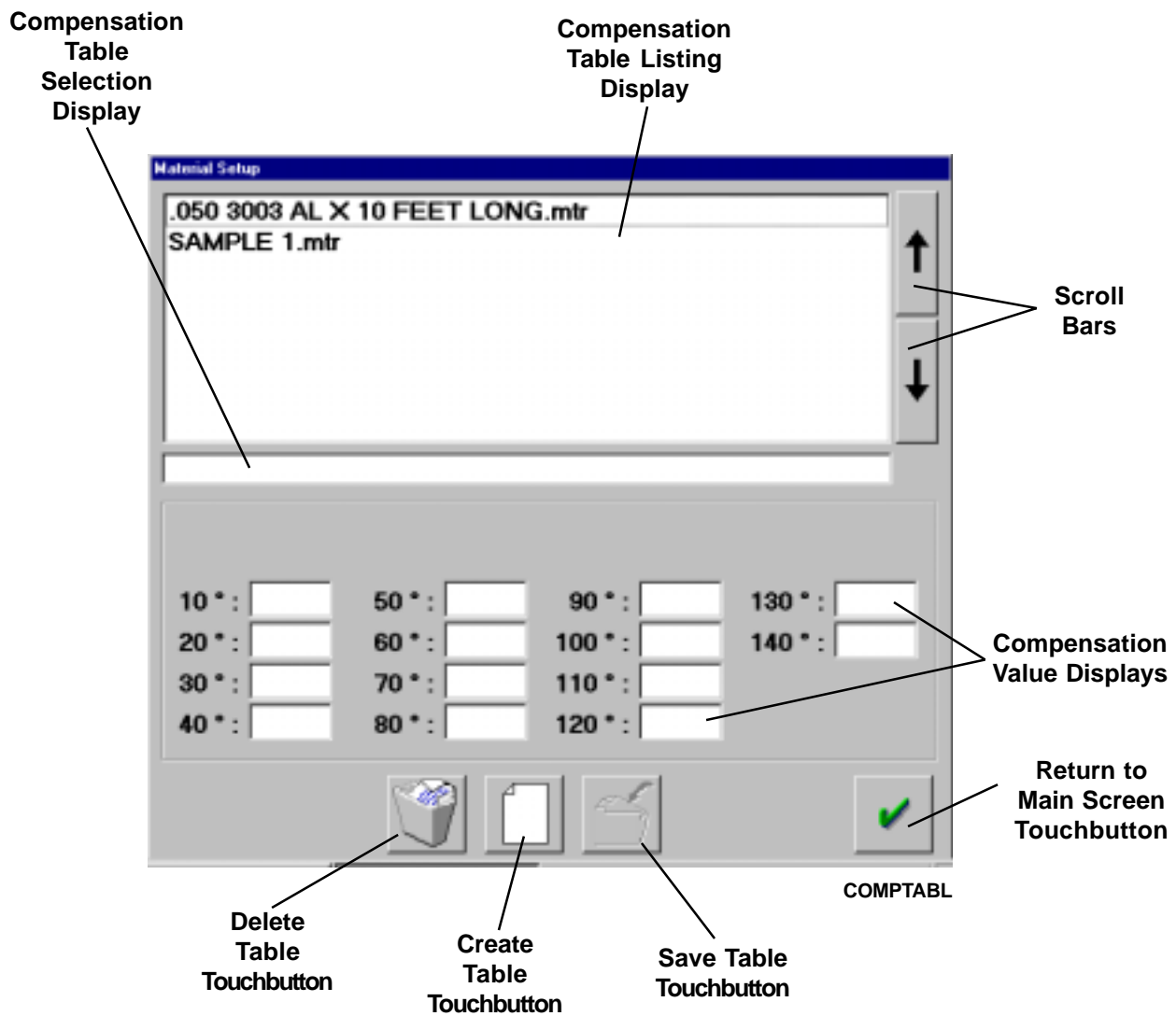


Figure B-2. Angle Compensation Tables Screen

**ANGLE
COMPENSATION
TABLES
SCREEN**

The Angle Compensation Screen is shown in Figure B-2. Elements comprising the screen are described below.

**COMPENSATION
TABLE
LISTING
DISPLAY**

The Compensation Table Listing Display lists all the angle compensation tables contained on the system hard drive. Compensation table files are designated by the **.mtr** extension.

**COMPENSATION
TABLE
SELECTION
DISPLAY**

The Compensation Table Selection Display will show the name of a compensation table being prepared, or the name of a compensation table selected for deletion.

SCROLL BARS

The Scroll Bars enable the operator to scroll backward and forward through the list of compensation tables shown in the Compensation Table Listing Display when the number of tables contained on the hard drive is too large to fit entirely in the display.

**COMPENSATION
VALUE
DISPLAYS**

The Compensation Value Displays contain the compensation values entered for the designated angles. The values are effective over a range of +/- 4 degrees from the designated angle, except for the value entered for 10 degrees, which is effective from 1 degree through 14 degrees.

**CREATE
TABLE
TOUCHBUTTON**

The Create Table Touchbutton initiates table creation. See the instructions beginning with Figure B-3.

**SAVE TABLE
TOUCHBUTTON**

The Save Table Touchbutton saves a newly created table. See the instructions beginning with Figure B-5.

**DELETE
TABLE
TOUCHBUTTON**

The Delete Table Touchbutton initiates the deletion of a table. See the instructions beginning with Figure B-6.

**RETURN TO
MAIN SCREEN
TOUCHBUTTON**

The Return To Main Screen Touchbutton returns you to the Main Screen.

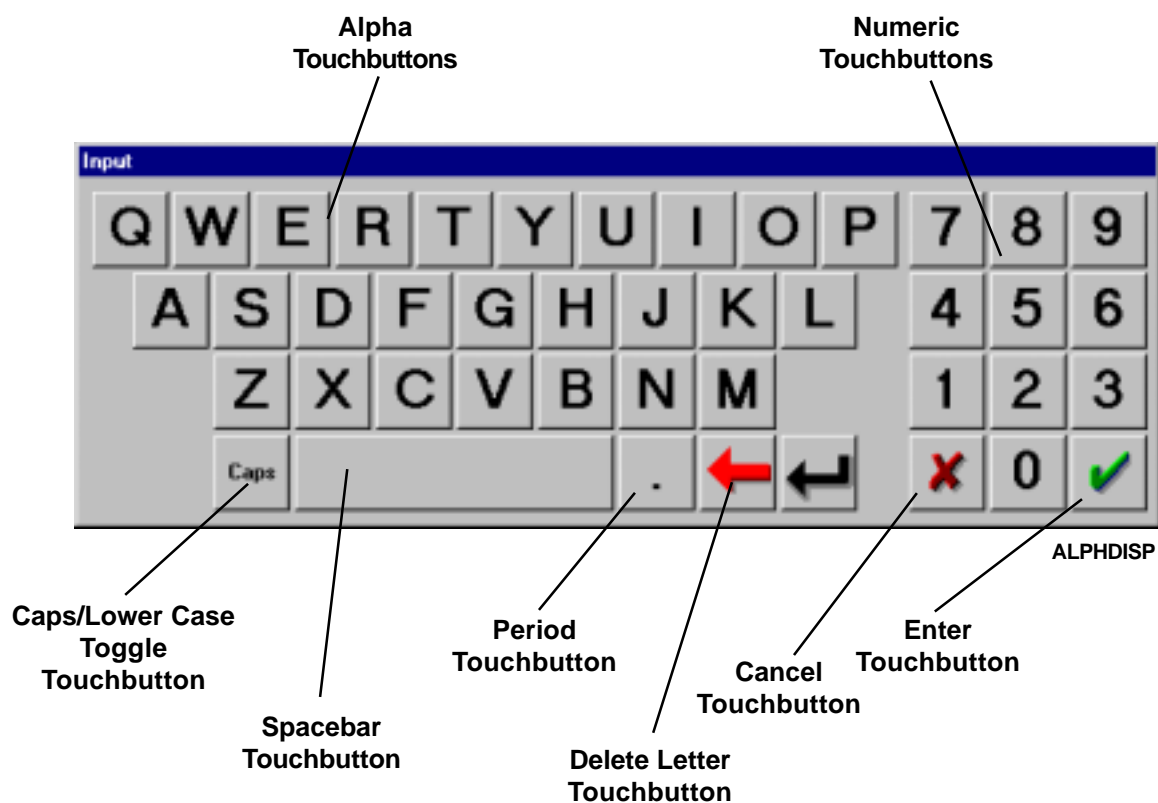


Figure B-3. The Alpha-Numeric Pop-Up Keypad

**CREATING AND
ANGLE
COMPENSATION
TABLE**

To create an Angle Compensation Table, press the Create Table Touchbutton on the Angle Compensation Table Screen shown in Figure B-2.

The Alpha/Numeric Pop-Up Keypad, shown in Figure B-3, will appear. This keypad is used to enter a file name for the Angle Compensation Table. The file name must be entered before the table can be created.

**ENTERING THE
TABLE NAME**

As the table name is entered, it appears in the Compensation Table Selection Display. shown in Figure B-2.

Textual data is entered by using the Alpha Touchbuttons. Numbers are entered by using the Numeric Touchbuttons. The Period Touchbutton is used to enter a period in the text. Spaces between words are added by using the Spacebar Touchbutton. Use the Upper/Lower Case Toggle Touchbutton to change from upper to lower case and back again. When this toggle is used, it automatically changes the Alpha-Touchbuttons from one case to the other. As the data is entered, it appears in the Program Title Area of the Program Selection display.

A character or space can be removed by touching the Delete Letter Touchbutton. When this touchbutton is used, it removes one character at a time, starting from the right.

The entry can be cleared completely by touching the Cancel Touchbutton.

When the entry shown is that desired, touch the Enter Touchbutton on the Alpha/Numeric Pop-Up Keypad. The keypad will disappear, and the name shown in the Compensation Table Selection Display will be followed by the **.mtr** extension. Compensation values may now be entered in the Compensation Value Displays.

**ENTERING
COMPENSATION
VALUES**

Touch the first Compensation Table Selection Display for which a value is to be entered. The Numeric Keypad shown in Figure B-4 will appear.

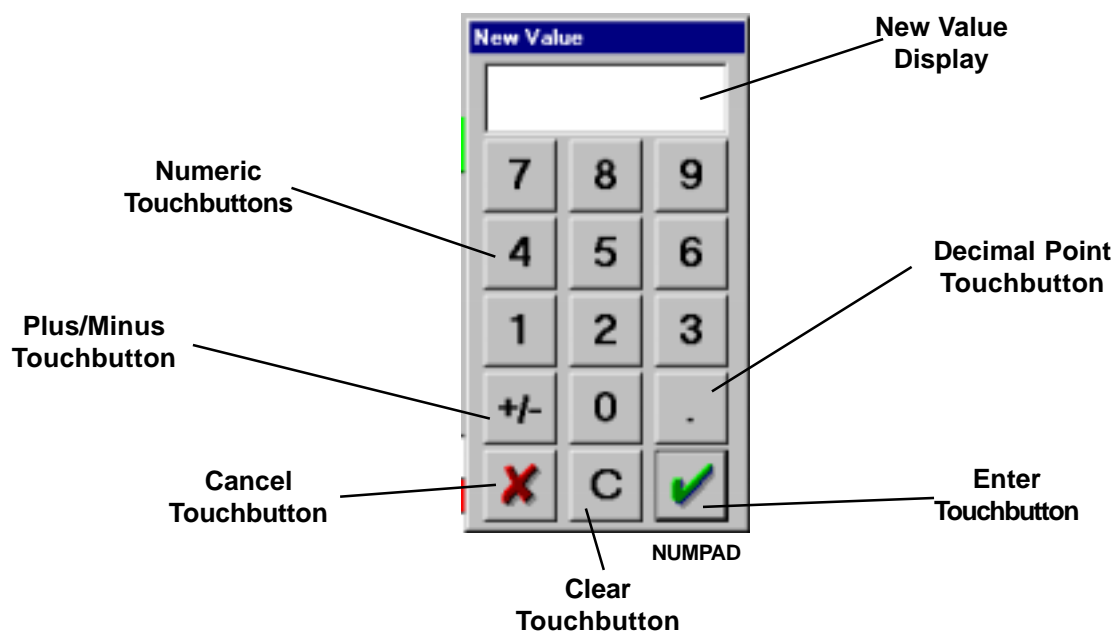


Figure B-4. The Numeric Pop-Up Keypad

**ENTERING
ANGLE
COMPENSATION
DATA**

Angle compensation data is entered by using the Numeric Touchbuttons. As the data is entered, it appears in the New Value Display at the top of the keypad. A decimal point is entered by using the Decimal Point Touchbutton.

Numeric values can be made positive or negative by using the Plus/Minus Touchbutton, which can be used at the beginning of an entry, or at any point after numeric data is entered.

A numeral can be removed from the New Value Display by touching the Clear Touchbutton. When this touchbutton is used, it removes one number at a time, starting from the right.

The New Value Display can be cleared completely by touching the Cancel Touchbutton.

The values are effective over a range of ± 4 degrees from the designated angle, except for the value entered for 10 degrees, which is effective from 1 degree through 14 degrees.

When the value shown in the New Value Display is the value desired, touch the Enter Touchbutton to enter the number into the Compensation Value Display. The Numeric Pop-Up Keypad disappears from the screen.

Material Setup

060 ALUMINUM.mtr

10 ° :	2.0°	50 ° :	0.0°	90 ° :	0.0°	130 ° :	0.0°
20 ° :	3.0°	60 ° :	0.0°	100 ° :	0.0°	140 ° :	0.0°
30 ° :	4.0°	70 ° :	0.0°	110 ° :	0.0°		
40 ° :	0.0°	80 ° :	0.0°	120 ° :	0.0°		

COMPTAB2

Save Table Touchbutton

Figure B-5. A Completed Angle Compensation Table

The process is repeated for each compensation value to be entered. Values need not be entered in all the Compensation Value Displays.

When all desired values have been entered, touch the Save Table Touchbutton, the Table name shown in the Compensation Table Selection Display will move to the Compensation Table Listing Display, and the Compensation Table will be saved to the system hard drive.

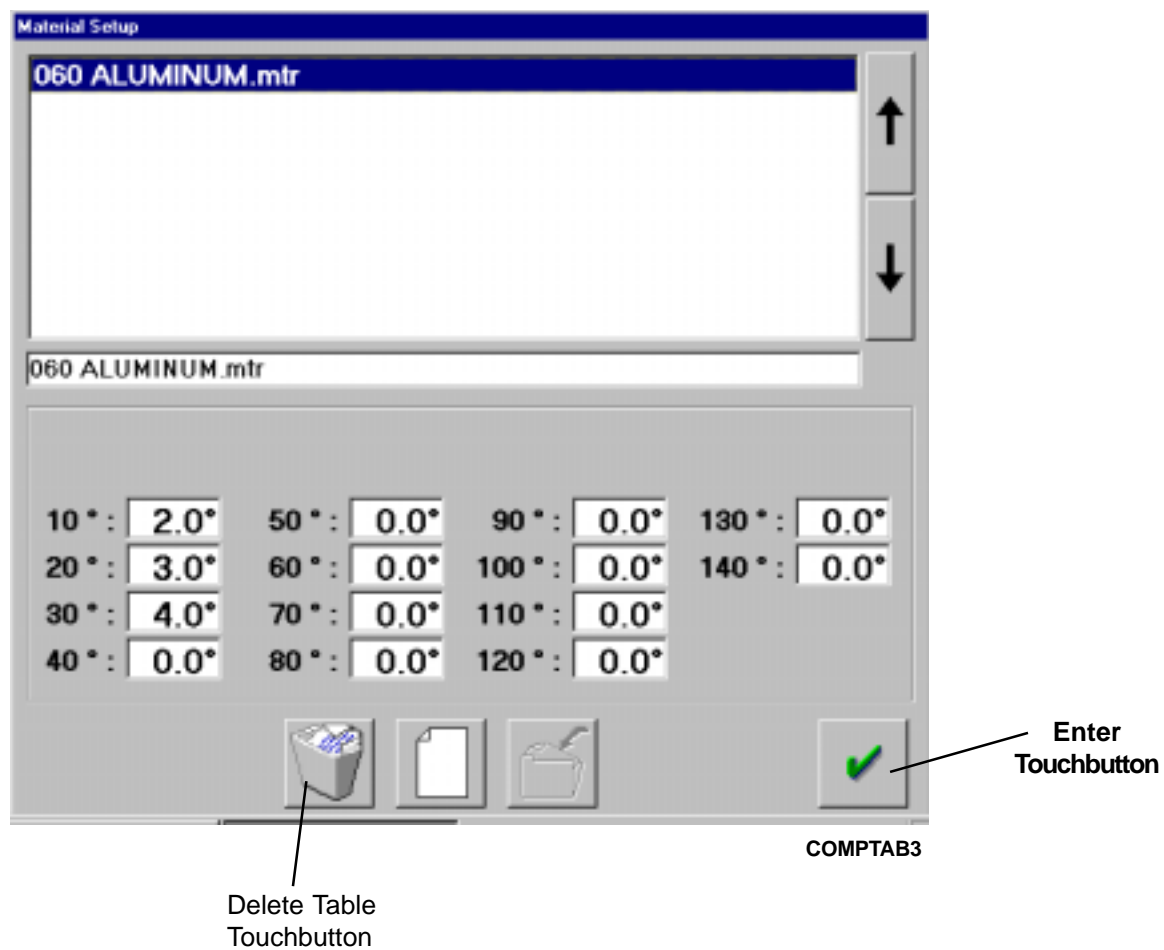


Figure B-6. Selecting a Compensation Table to be Deleted

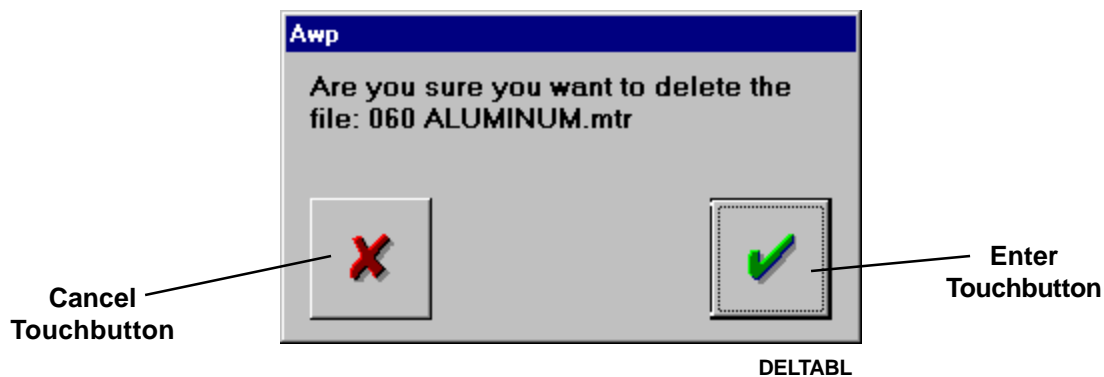


Figure B-7. Delete Table Confirmation Display

**DELETING AN
ANGLE
COMENSATION
TABLE**

If it is desired to delete an Angle Compensation Table, use the following procedure.

Bring up the Angle Compensation Table Screen shown in Figure B-6. The list of Angle Compensation Tables will appear in the Compensation Table Listing Display.

Touch the file name of the Compensation Table to be removed. The file name will appear in the Compensation Table Selection Display. Touch the Delete Table Touchbutton and the Delete Table Confirmation Display shown in Figure B-7 will appear.

At this point, the delete operation can be halted by touching the Cancel Touchbutton in the Delete Table Confirmation Display.

If the correct table to be removed appears in the Compensation Table Selection Display, touch the Enter Touchbutton in the Delete Table Confirmation Display. The Confirmation display will disappear and the Compensation Table will be removed from the system hard drive.

Touch the Enter Touchbutton in the Angle Compensation Table Screen shown in Figure C-6 to return to the system Main Screen.

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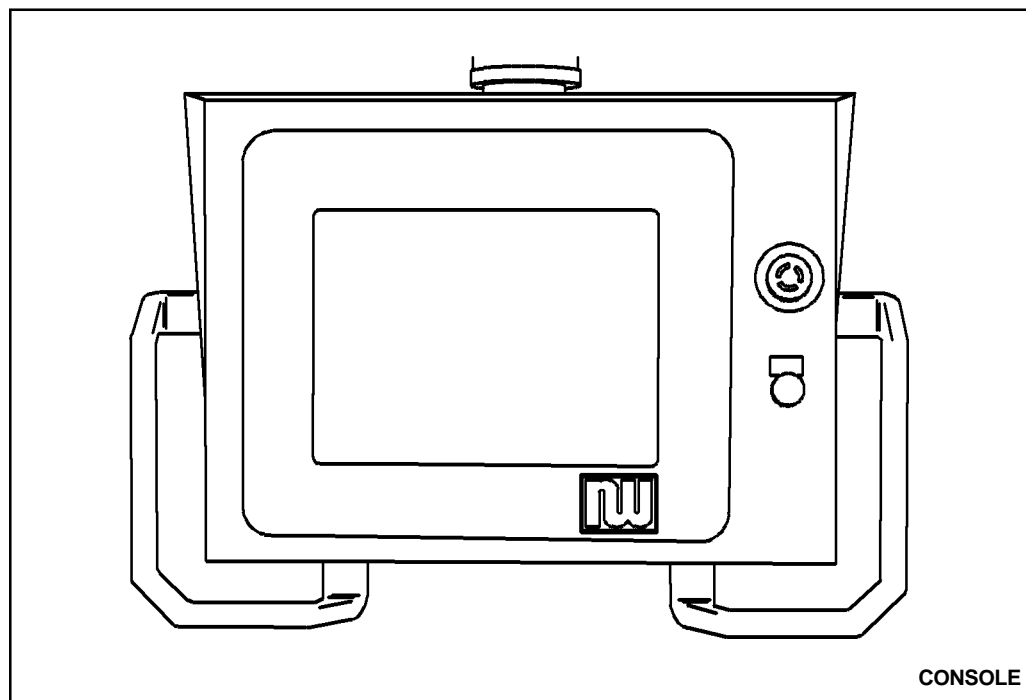
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Appendix C Programming Examples



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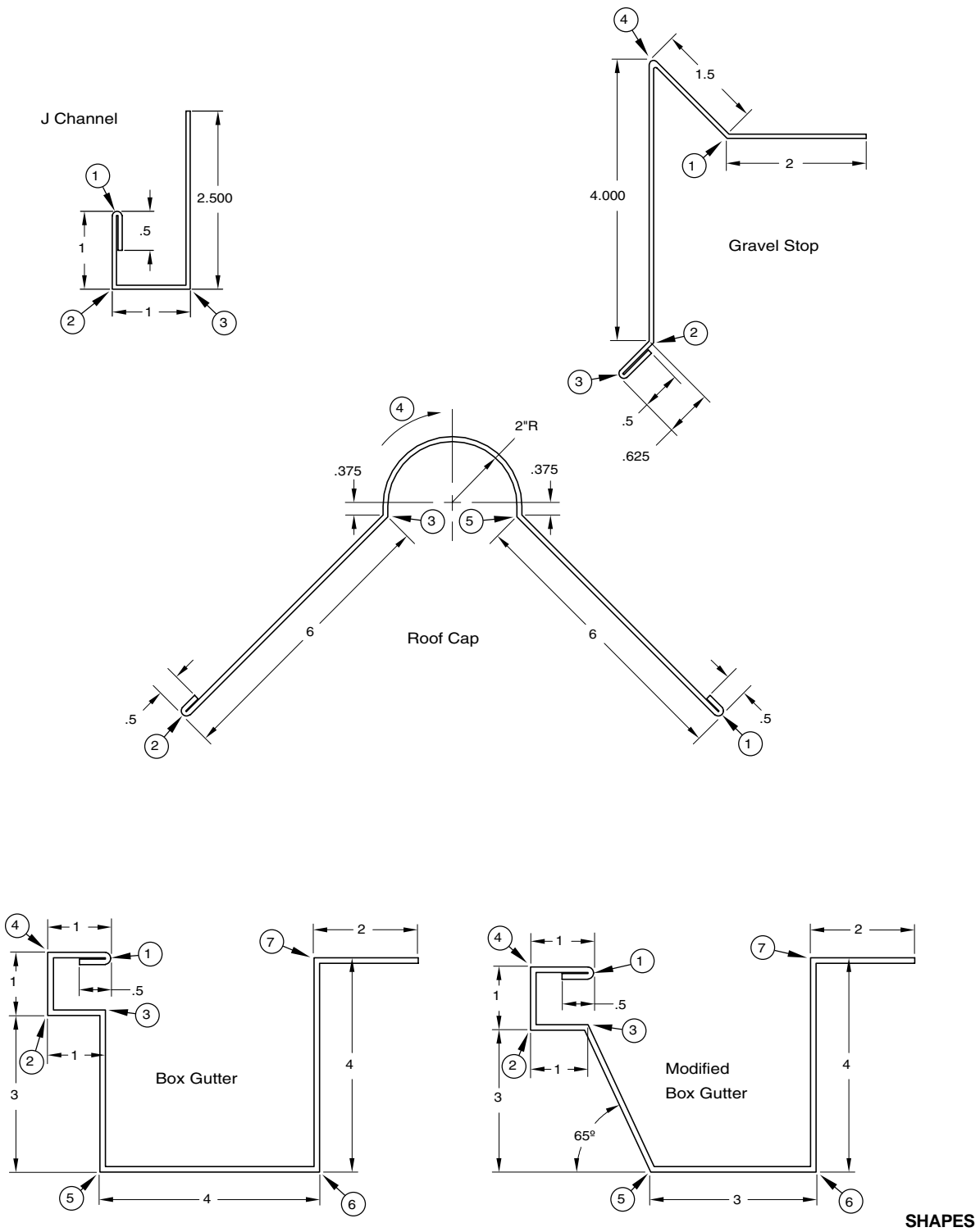


Figure C-1. Dimensions and Bend Order for the profiles Shown in Appendix C

APPENDIX A

PROGRAMMING EXAMPLES

This Appendix contains several programming examples pertaining to the Orion Control System. Each of the programming examples has been included to illustrate certain aspects of the programming process. The descriptions below highlight various aspects of the programming procedure.

MANUAL PROGRAMMING

**BASIC
PROCEDURE,
PAGE 4**

The Manual Programming Example shows the general methods used in manual programming, using a simple J Channel as an example. Save procedures for programs are shown.

**ATTACHING A
DRAWING,
PAGE 10**

The second Manual Programming Example shows how to create a drawing for an existing manual program using graphic programming methods. The example then shows how to attach the drawing to the program. The simple J Channel is used.

GRAPHIC PROGRAMMING

**BASIC
PROCEDURE:
GRAVEL STOP,
PAGE 20**

The first Graphic Programming Example features a Gravel Stop. Specific procedures cover the programming for a closed hem, and the programming of an acute angle bend.

**HEMS, RADII:
ROOF CAP,
PAGE 34**

The second Graphic Programming Example features a Roof Cap. Specific procedures cover the programming for an open hem, and the programming for a radius.

**REVERSE
ANGLES:
RAIN GUTTER,
PAGE 54**

The third Graphic Programming Example features a complicated Rain Gutter. Specific procedures cover the programming for an open hem, and the handling of "reverse angle" bends.

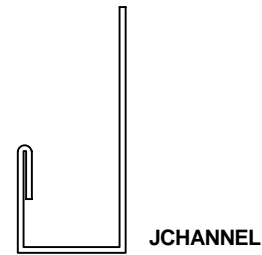
**MODIFYING
PROGRAMS:
PAGE 72**

The final Graphic Programming Example shows how to modify an existing graphic program, using the Rain Gutter as the modified part.

DIMENSIONS AND BEND ORDER

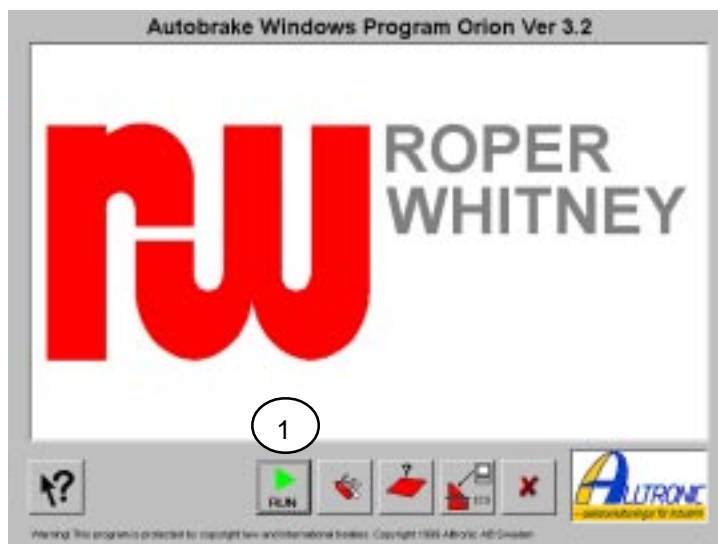
Dimensions and bend order are shown for each of the programming examples in Figure C-1. The bend order for each profile is indicated by the numbers in the circles.

MANUAL PROGRAMMING EXAMPLE J CHANNEL

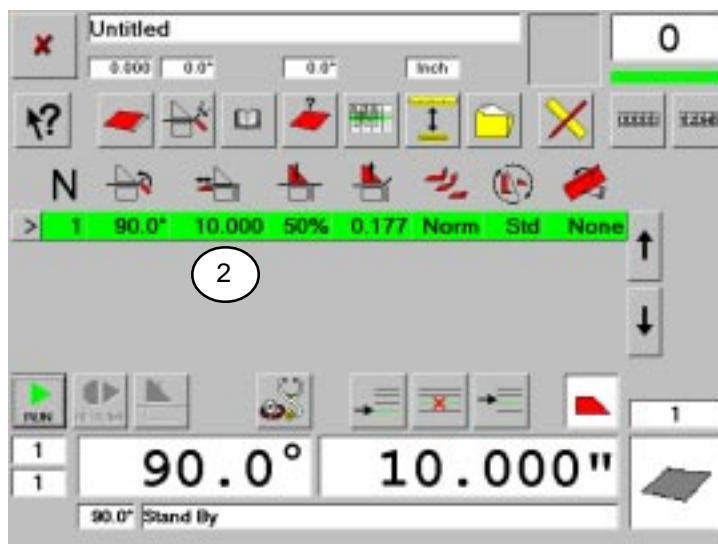


JCHANNEL

1. Touch the Run/Programming Touchbutton to bring up the Run/Programming Screen.



MAINSR

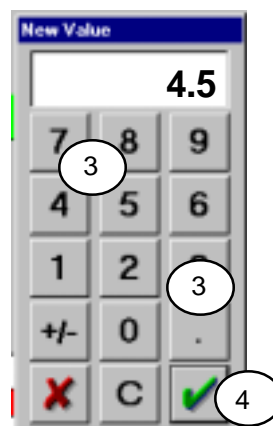


RUNPROG

Programming can begin as soon as the Run/Programming Screen appears. The first operation will appear as a green line across the screen.

The backgauge must be positioned for the first operation.

2. Touch the backgauge column in the first operation row. This will highlight the value in red, and the Numeric Keypas will appear at the side of the screen.



NUMPAD

3. Touch the **4**, the **decimal point**, and the **5** Touchbuttons to enter the desired backgauge position (**4.5**) Be sure the number appears in the box at the top of the display

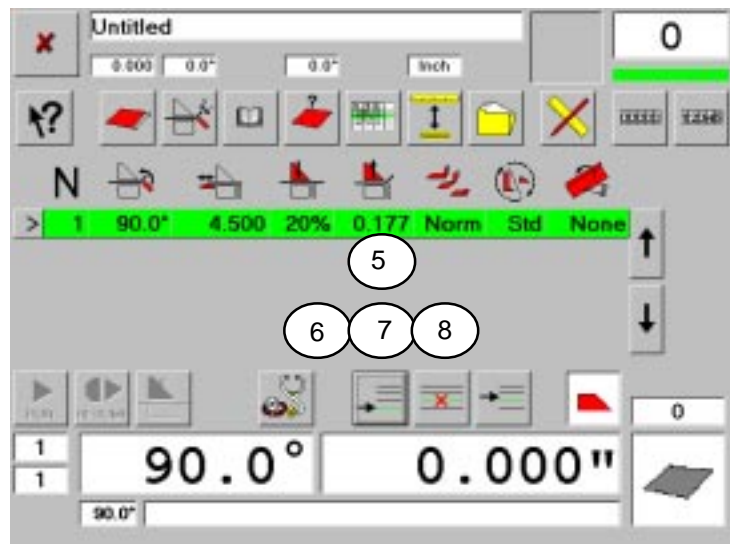
4. Touch the Enter Touchbutton to move the value **4.5** to the backgauge position column in the first operation line.

5. Touch the Open Height Column to change the open height of the clamp beam.

6. Touch the **decimal point** Touchbutton in the Numeric keypad Popup Display.

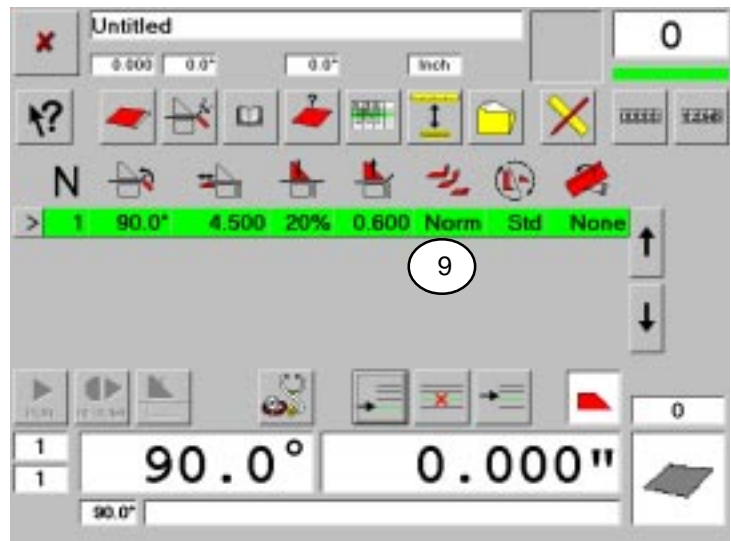
7. Touch the **.6** in the Numeric keypad Popup Display.

8. Touch the Enter Touchbutton to move the value **.6** to the Open Height Column in the first operation line.



MANPRG02

9. Touch the Hem Column in the program line to bring up the hem Data Pop-Up Display.



MANPRG01

10. Touch the Closed Hem Touchbutton to activate the hem Data Displays.



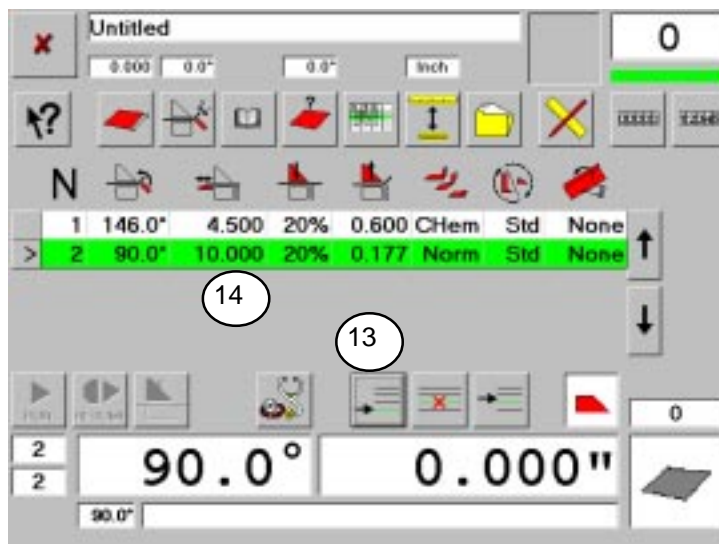
PRHEM01

11. Examine the closed hem default values. Change the pressure to 100%.

12. Touch the Enter Touchbutton to accept the hem data into the program.



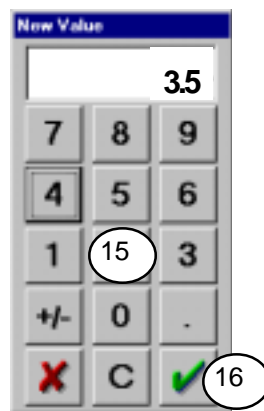
PRHEM03



MANPRG03

13. Touch the Add Program Step Touchbutton to add an operation line for the second operation.

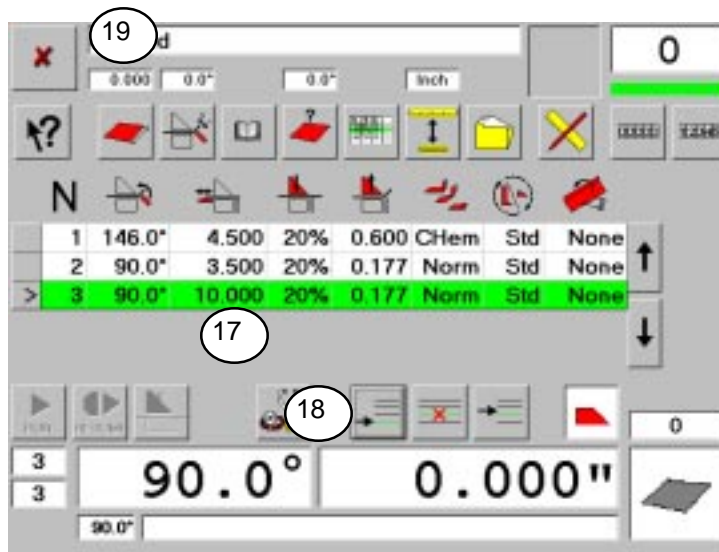
14. Touch the backgauge column in the second operation row.



NUMPAD6

15. Touch the **3**, the **decimal point**, and the **4** Touchbuttons to enter the desired backgauge position (**3.5**) Be sure the number appears in the box at the top of the display

16. Touch the Enter Touchbutton to move the value **3.5** to the backgauge position column in the second operation line.



MANPRG04

17. Touch the backgauge column in the third, operation row, enter **2.5**, and touch the Enter Touchbutton to move the value **2.5** to the backgauge position column in the third operation line.

18. Touch the Add Program Step Touchbutton to add an operation line for the second bend (third operation).

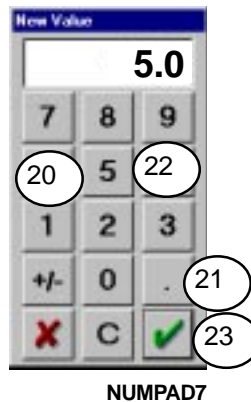
19. Touch the Blank Size Display.

20.Touch the **5** Touchbuttons.

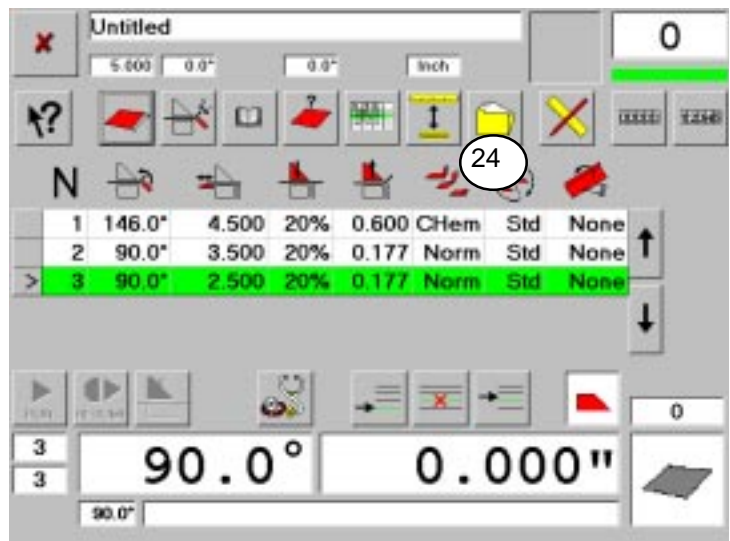
21.Touch the **Decimal Point** Touchbutton.

22.Touch the **0** Touchbutton.

23.Touch the Enter Touchbutton to move the value **5.0** to the Blank Size Display.



24.The program is now ready to be saved. Touch the File Manager Touchbutton to bring up the File Manager Pop-Up Display

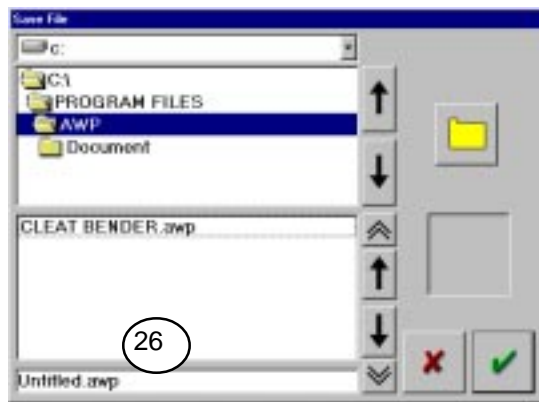


MANPRG05

25.Touch the Save File Touchbutton. This will bring up the File Selection Display.

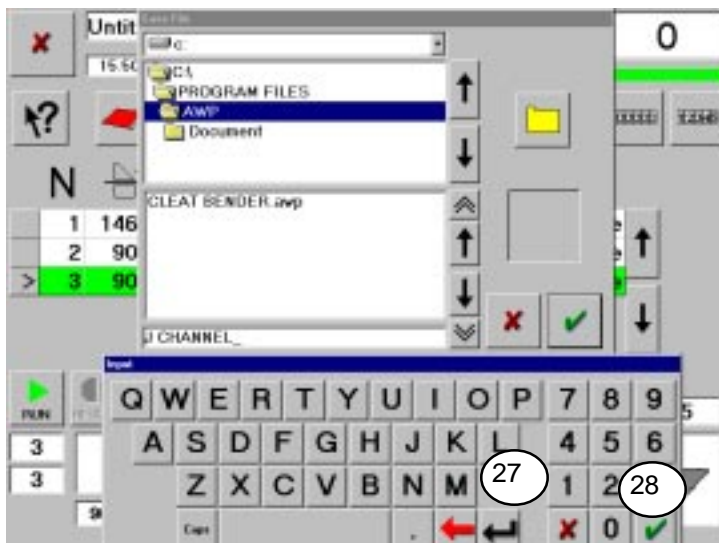


FILEMGR



SAVFIL05

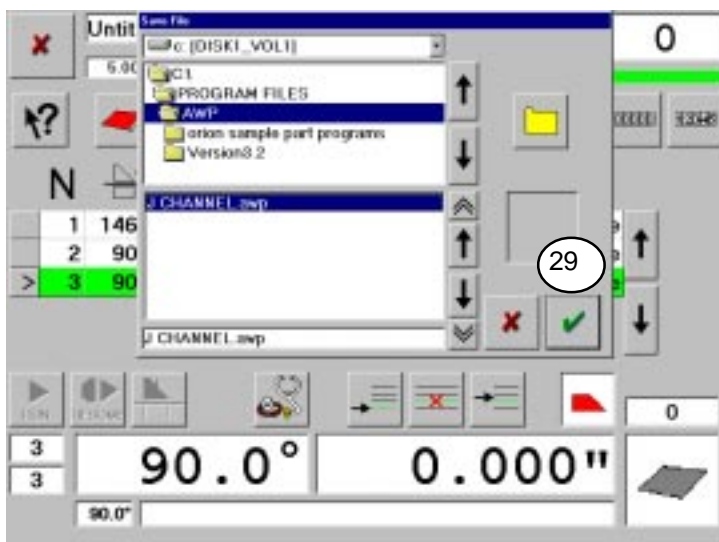
26. Touch the Program Title Display, which reads “**Untitled.adp**”. This will bring up the Alpha-Numeric Keypad.



MANPRG06

27. Enter a program name using the Alpha-Numeric Touchjbuttons. As the characters are entered, they will appear in the Program Title Display.

28. When the name has been entered, touch the Enter Touchbutton. The Alpha-Numeric keypad will disappear, and the extension **.awp** will appear behind the name in the Program Title Display. This extension identifies the file as a program file.

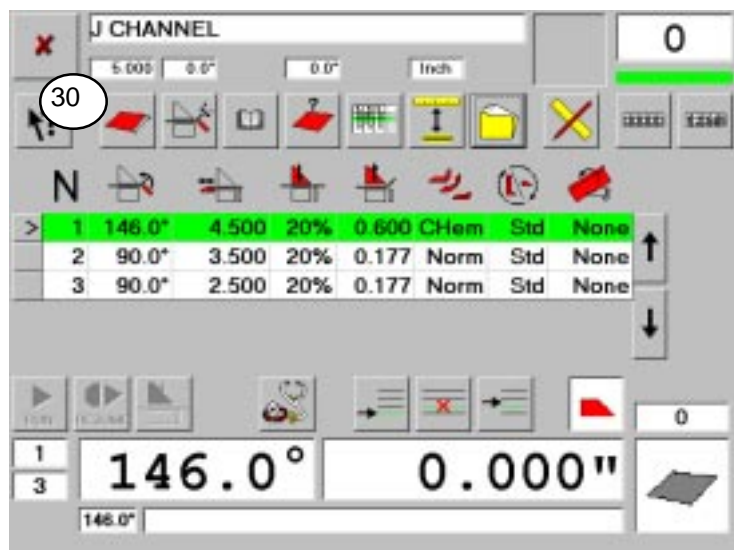


MANPRG09

At this point, the system is ready for additional programming, or for operation.

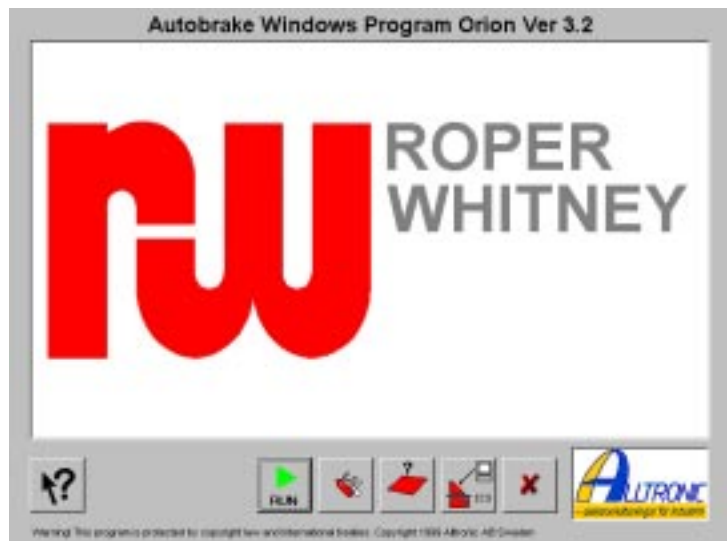
29. Touch the Enter Touchbutton to apply the program name to the completed program.

30. To return to the Main Screen, touch the Cancel Touchbutton.

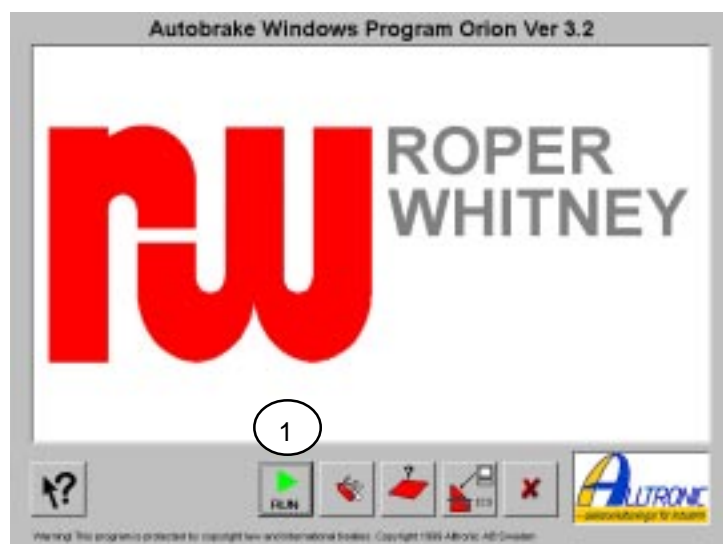


MANPRG07

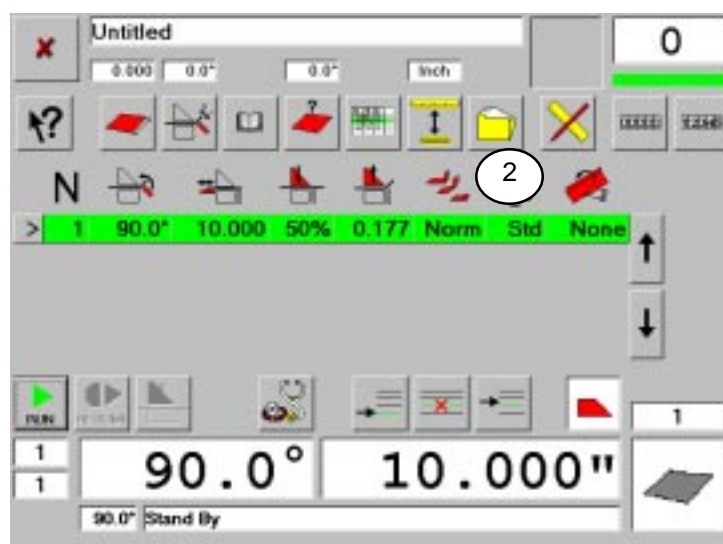
At this point, the system is ready for additional programming, or for operation.



MAINS



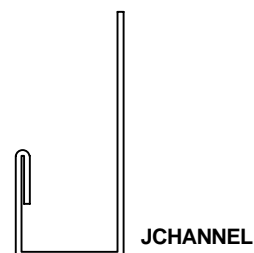
MAINSR



FILEMGR

MANUAL PROGRAMMING EXAMPLE

ATTACHING A DRAWING TO AN EXISTING MANUAL PROGRAM



1. Touch the Run/Programming Touchbutton to bring up the Run/Programming Screen.

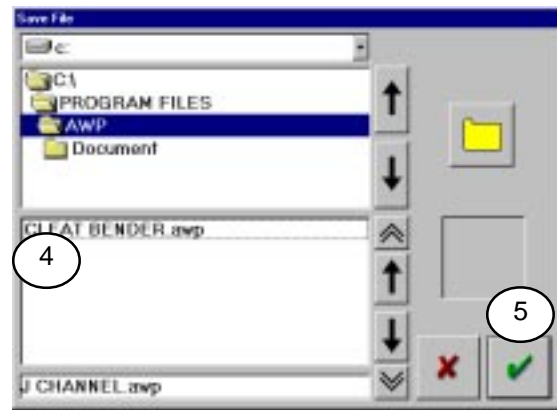
2. Touch the File Management Touchbutton to bring up the File Management Pop-Up Display.

3. Touch the Open File Touchbutton to bring up the File Selection Display.

4. Select the J Channel.awp program.
5. When the program appears in the Program Title Display, press the Enter Touchbutton to bring up the Run/Programming Screen with the J Channel program displayed.

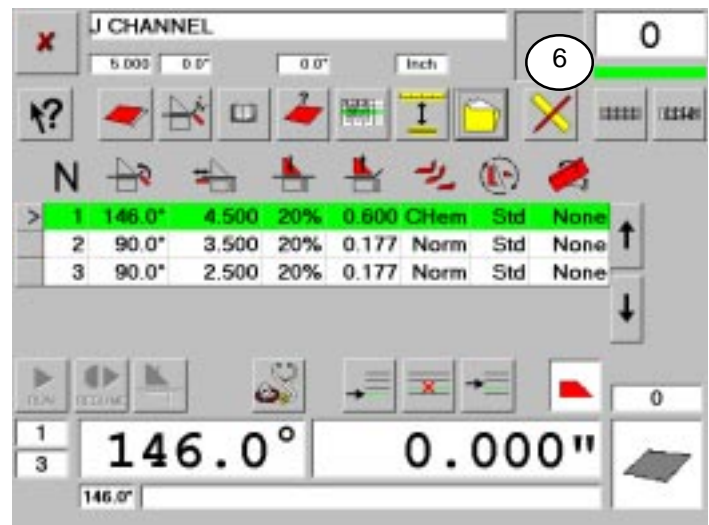
NOTE:

The program to which the drawing is to be attached must be opened before the drawing can be attached to it. The remainder of the procedure prepares the drawing and attaches it to the J Channel program.



SAVFIL06

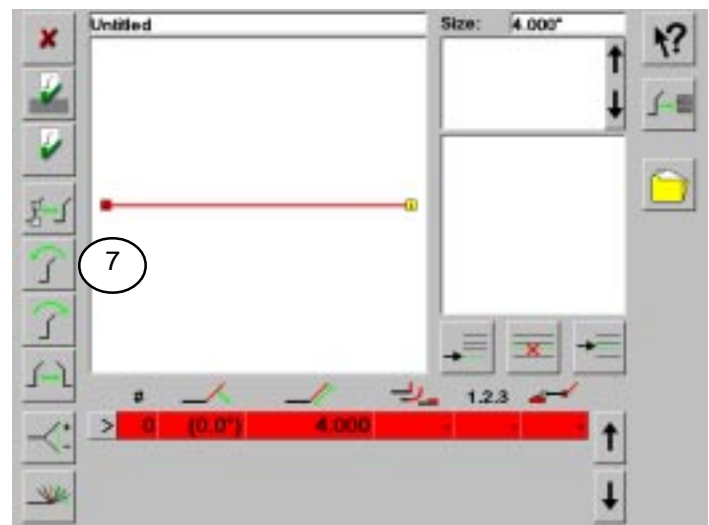
6. Touch the Graphic Programming Touchbutton to bring up the Graphic Programming Screen.



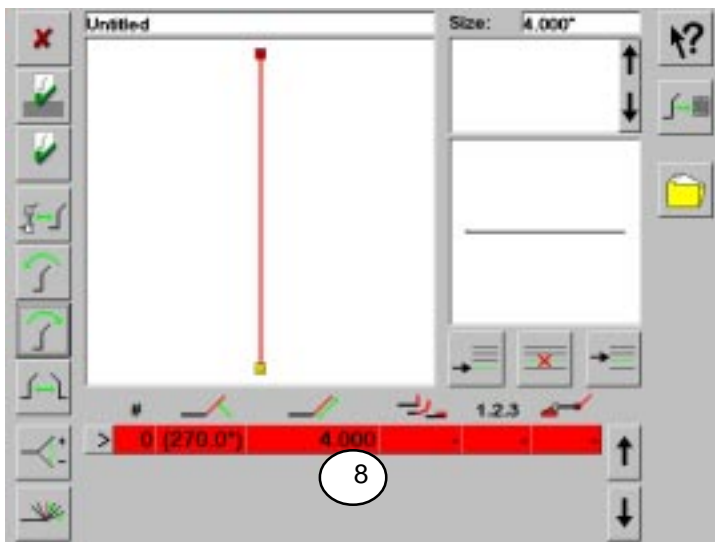
MANPRG07

You want to position the part vertically.

7. Touch the Rotate Counterclockwise Touchbutton twice. This will rotate the part 90°.



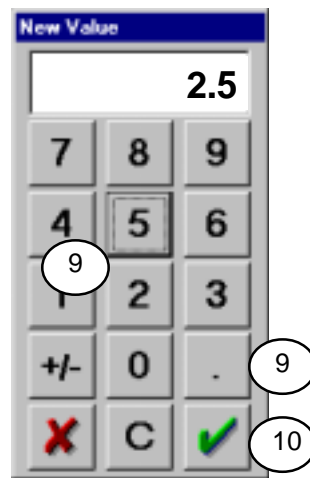
GRPR001



GRPR082

The default line length for the first line segment must be modified.

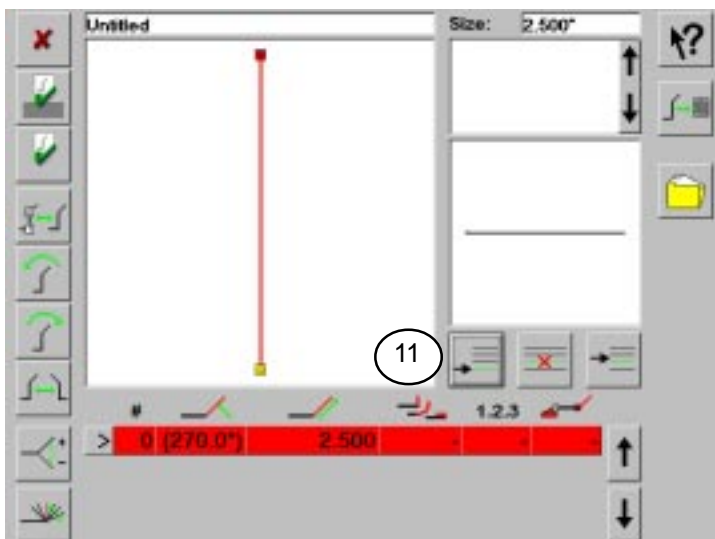
8. Touch the value **4.000** to bring up the Numeric Keypad.



NUMPAD8

9. Touch the **2**, the **decimal point**, and the **5** Touchbuttons to enter the desired line length (**2.5**). Be sure the number appears in the box at the top of the display

10. Touch the Enter Touchbutton to move the value **2.5** to the segment length column of the Graphic Programming Screen.



GRPR083

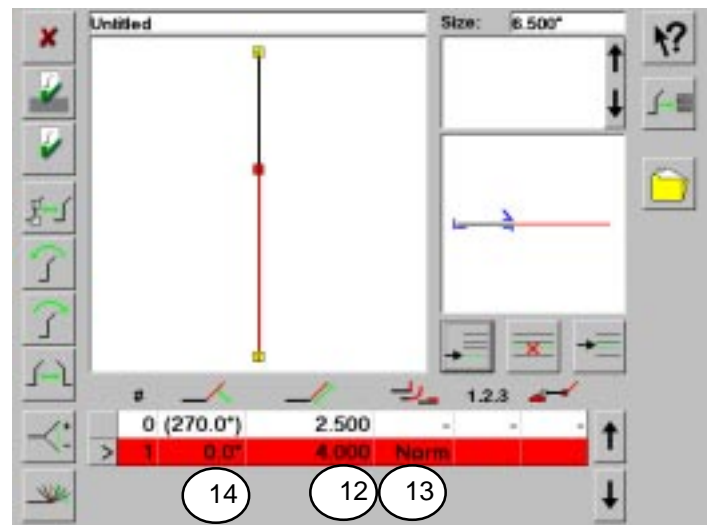
11. Touch the Add Operation Touchbutton to create a new program line.

12. Touch the value **4.000** to bring up the Numeric Keypad.

The default line length for the line segment must be modified.

13. On the Numeric Keypad, Touch the **1**, and the **decimal point** to enter the desired line length (**1.0**). Be sure the number appears in the box at the top of the display. Touch the Enter Touchbutton to move the value **1.0** to the segment length column of the Graphic Programming Screen.

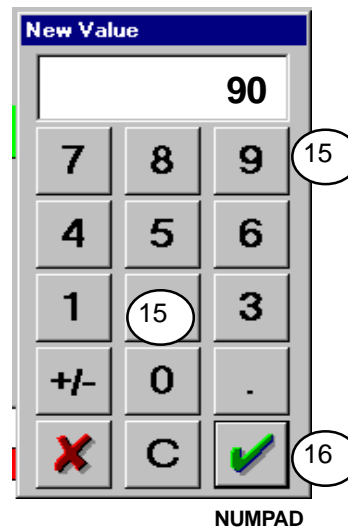
14. The bend angle must be entered. Touch the bend angle block to bring up the Numeric Keypad.



GRPR084

15. Enter **90** using the Numeric Keypad.

16. Transfer the value **90** to the Bend Angle Box in the Programming Screen by pressing the Enter Touchbutton.

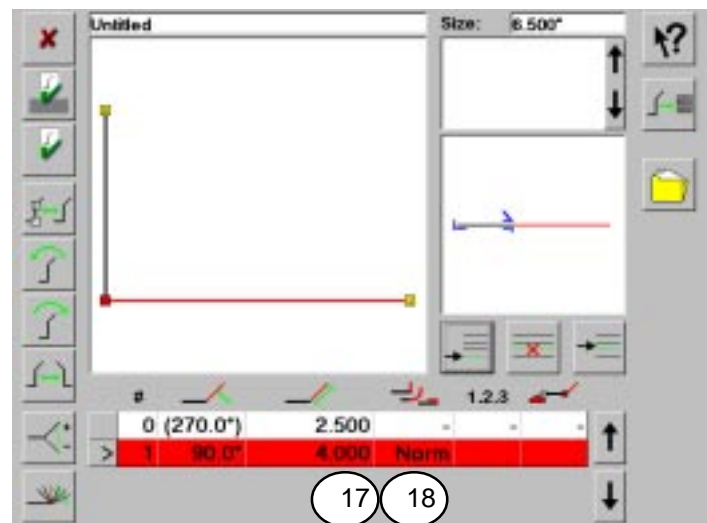


NUMPAD

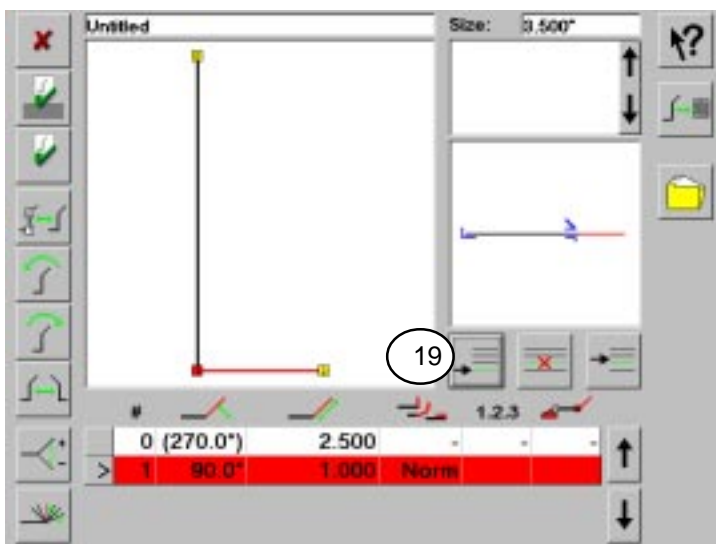
The default line length for the line segment must be modified.

17. Touch the value **4.000** to bring up the Numeric Keypad.

18. On the Numeric Keypad, Touch the **1**, and the **decimal point** to enter the desired line length (**1.0**). Be sure the number appears in the box at the top of the display. Touch the Enter Touchbutton to move the value **1.0** to the segment length column of the Graphic Programming Screen.

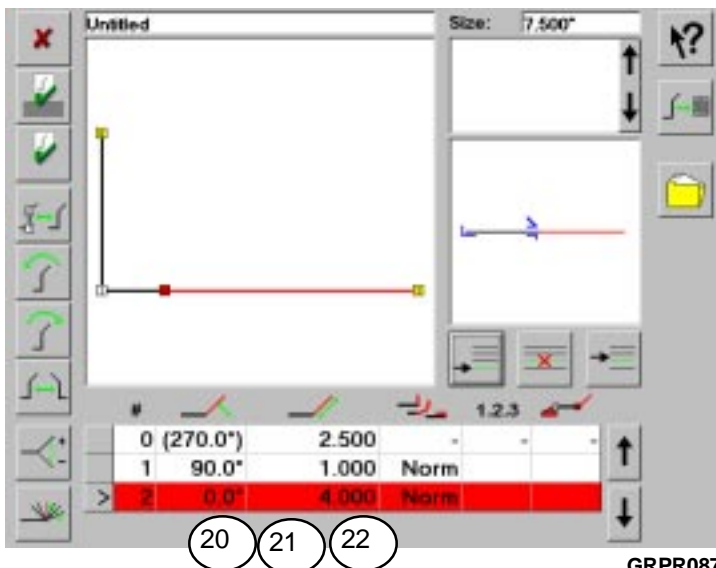


GRPR085



GRPR086

19. Touch the Add Operation Touchbutton to create a new program line.

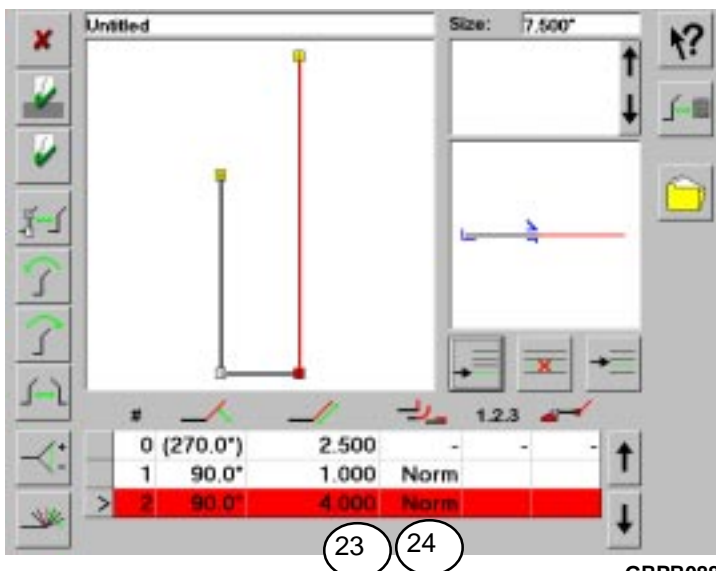


GRPR087

20. The bend angle must be entered. Touch the bend angle block to bring up the Numeric Keypad.

21. Enter **90** using the Numeric Keypad.

22. Transfer the value **90** to the Bend Angle Box in the Programming Screen by pressing the Enter Touchbutton.



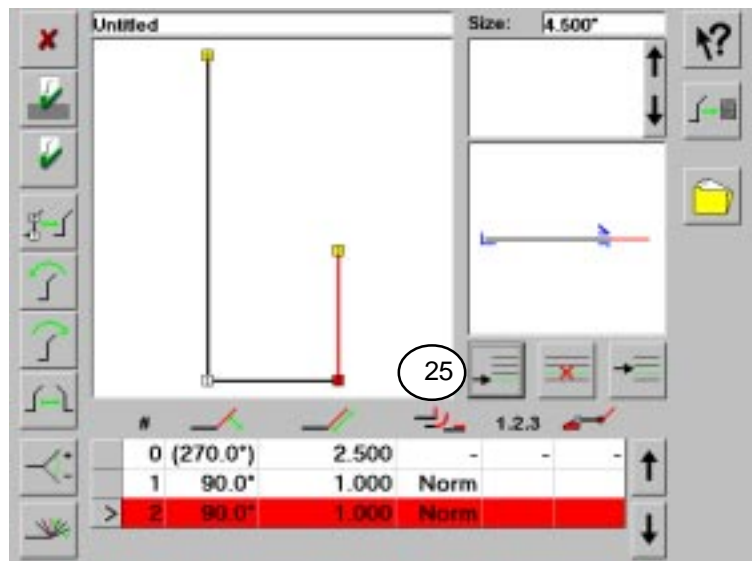
GRPR088

The default line length for the line segment must be modified.

23. Touch the value **4.000** to bring up the Numeric Keypad.

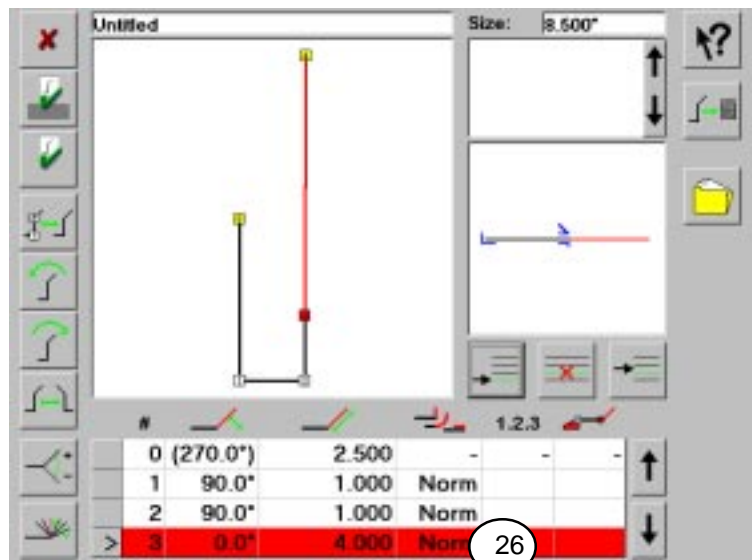
24. On the Numeric Keypad, Touch the **1**, and the **decimal point** to enter the desired line length (**1.0**). Be sure the number appears in the box at the top of the display. Touch the Enter Touchbutton to move the value **1.0** to the segment length column of the Graphic Programming Screen.

25. Touch the Add Operation Touchbutton to create a new program line.



GRPR089

26. Touch the hem Column in the new program line to bring up the Hem Data Pop-Up Display.



GRPR090

27. Touch the Closed Hem Touchbutton to activate the Hem Data Displays.



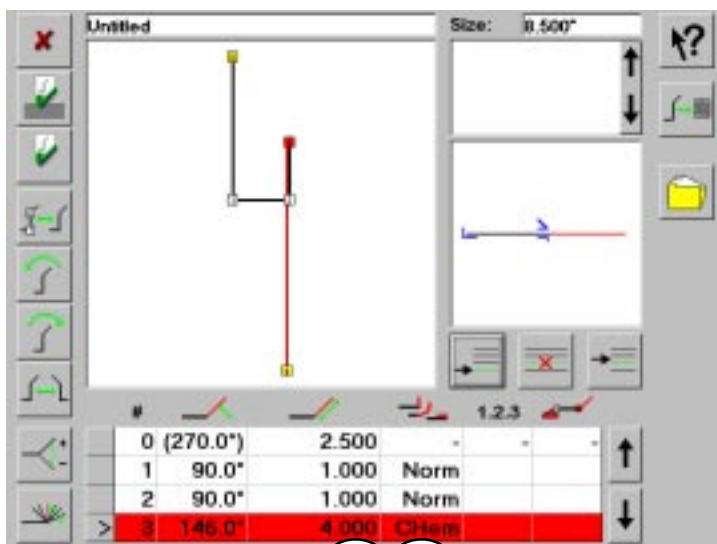
PRHEM01

28. It is not necessary to modify the default hem data because the drawing will not be used to create a program.

29. Touch the Enter Touchbutton to enter the hem data into the drawing.



PRHEM02

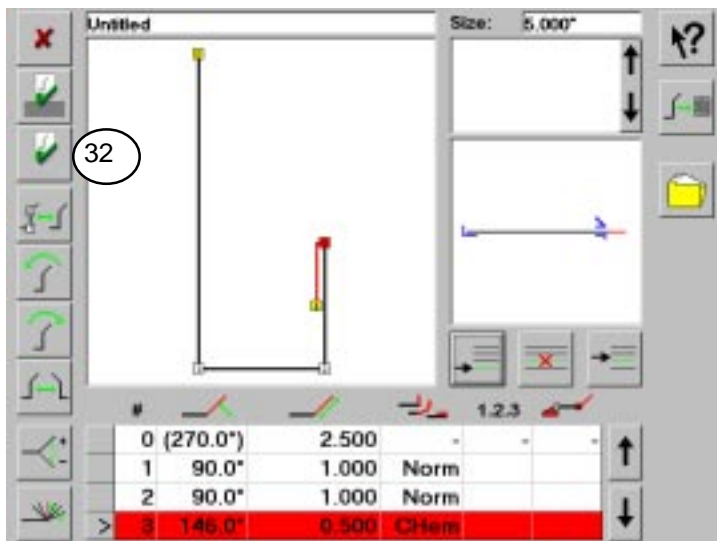


GRPR091

The default line length for the hem line segment must be modified.

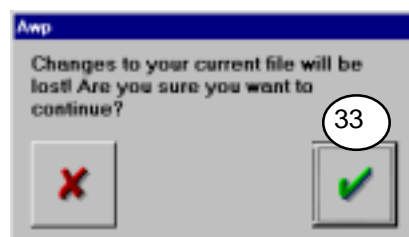
30. Touch the value **4.000** to bring up the Numeric Keypad.

31. On the Numeric Keypad, Touch the the **decimal point** and **5** to enter the desired line length (**0.5**). Be sure the number appears in the box at the top of the display. Touch the Enter Touchbutton to move the value **0.5** to the segment length column of the Graphic Programming Screen.



GRPR092

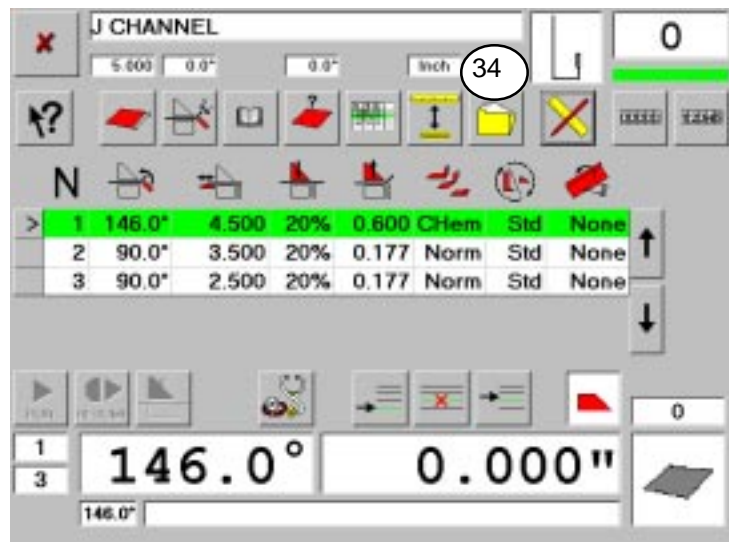
32. Touch the Create Image Touchbutton to attach the drawing to the manual program.



CHNGWARN

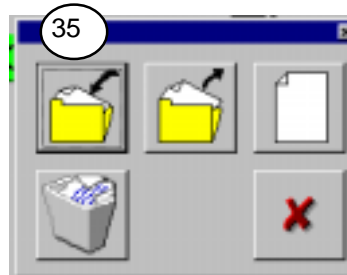
33. When the Lost Changes Warning Display appears, touch the Yes (green check) Touchbutton. This will bring up the Run/Programming Screen containing the J Channel program.

34. Touch the Program Management Touchbutton. This will bring up the Program Management Pop-Up Display.

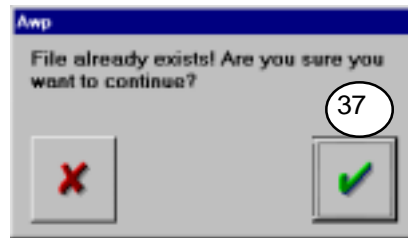


MANPRG08

35. Touch the Save File Touchbutton. This will bring up the Existing Program Warning Display

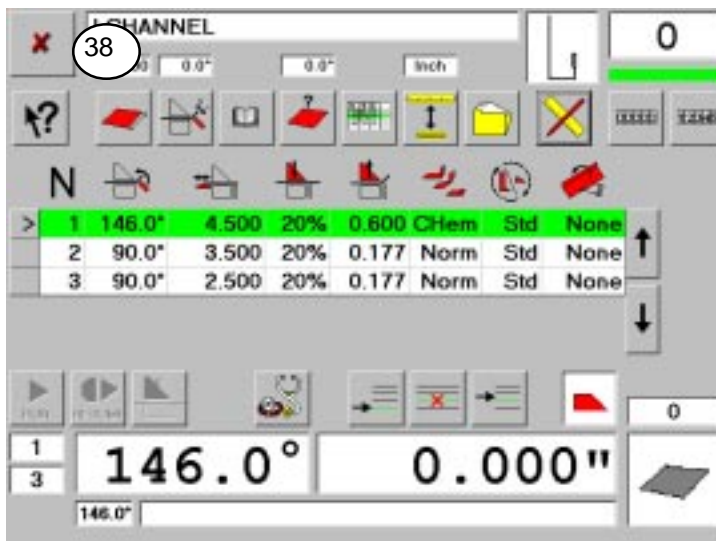


FILEMGR



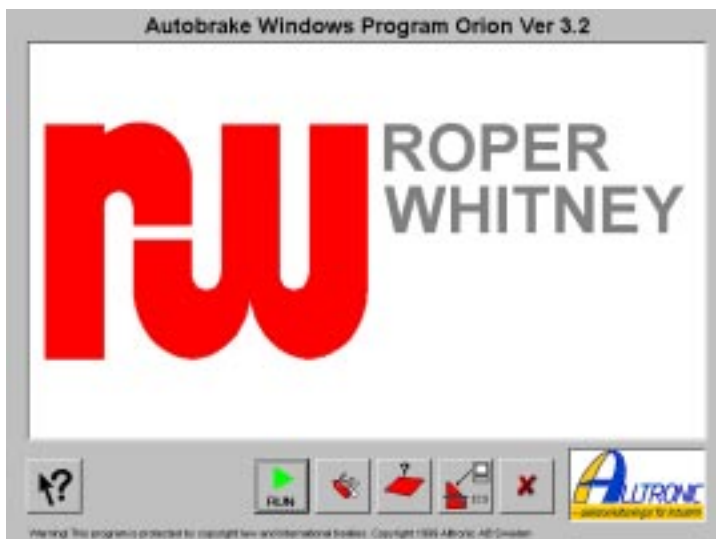
PROGWARN

37. When the Existing Program Warning Display appears, touch the Yes (green check) Touchbutton.



MANPRG08

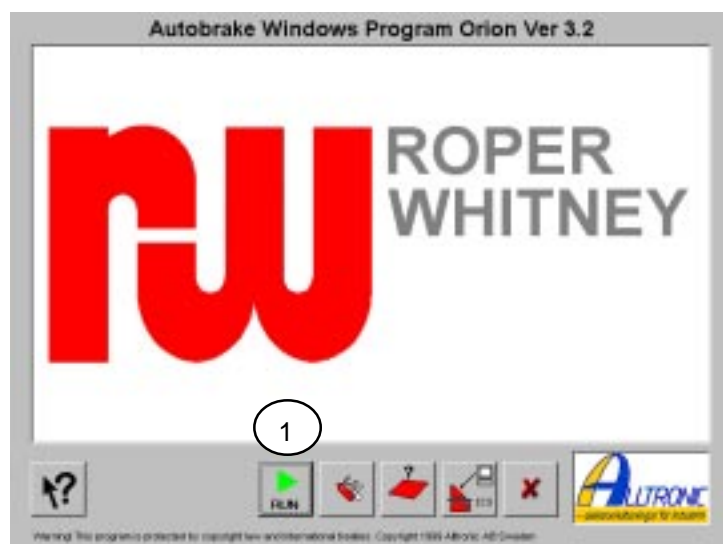
38. To return to the Main Screen, touch the Cancel Touchbutton.



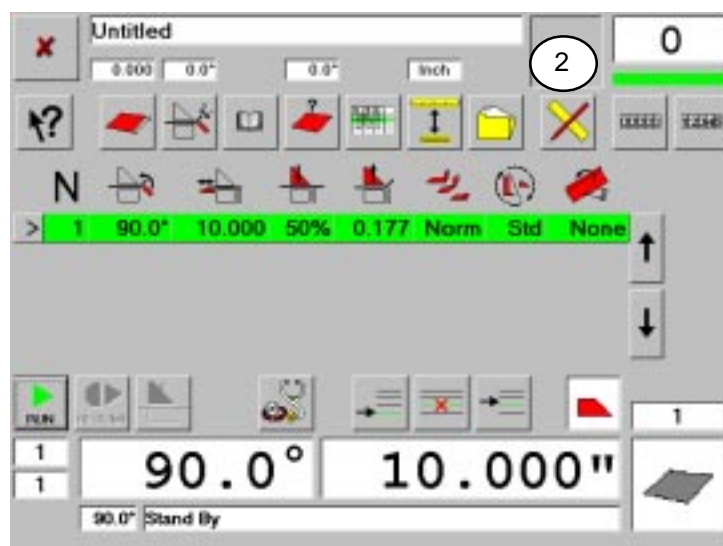
MAINSR

At this point, the system is ready for additional programming, or for operation.

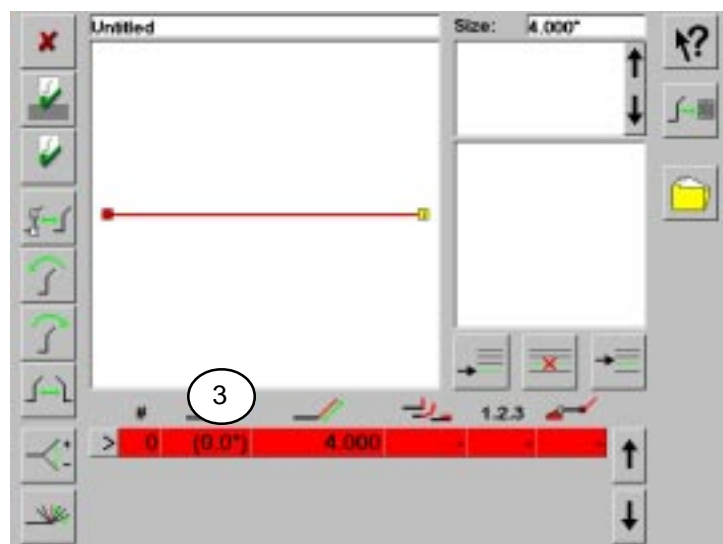
Intentionally blank.
Please continue.



MAINSCR

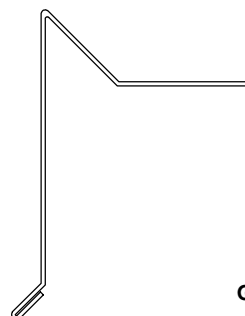


RUNPROG



GRPR001

GRAPHIC PROGRAMMING EXAMPLE GRAVEL STOP



GRAVSTOP

1. Touch the Run/Programming Touchbutton to bring up the Run/Programming Screen.

2. Touch the Graphic Programming Touchbutton to bring up the Graphic Programming Screen.

The programmer wishes to start programming with the line at an angle.

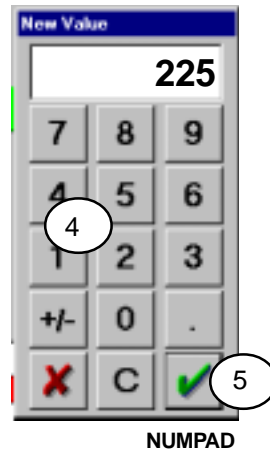
3. Touch the value angular value **0.0** to bring up the Numeric Keypad.

4. Touch the **2** twice and the **5** Touchbuttons to enter the desired angle of **225°**. Be sure the number appears in the box at the top of the display.

NOTE:

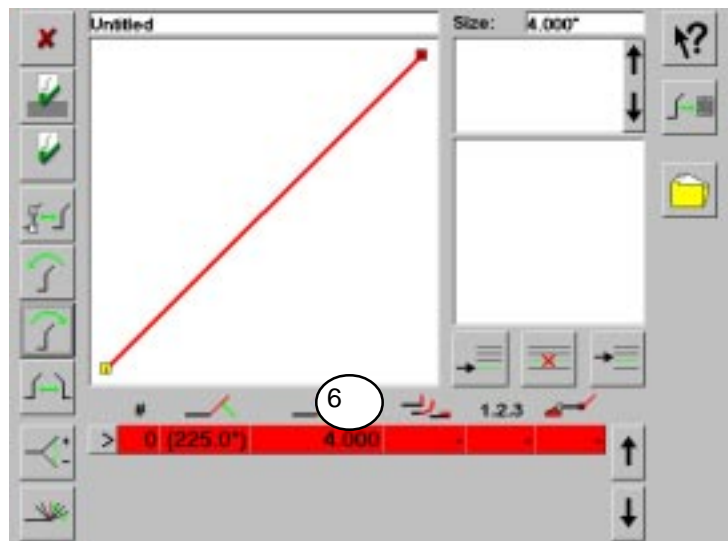
The desired angle is 45°, but this also “swaps” ends on the line in preparation for the hem operation which follows.

5. Touch the Enter Touchbutton to move the value **225** to the segment length column of the Graphic Programming Screen.



The default line length for the first line segment must be modified.

6. Touch the value **4.000** to bring up the Numeric Keypad.

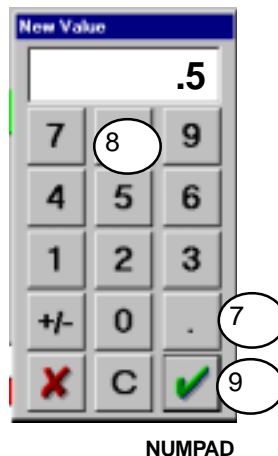


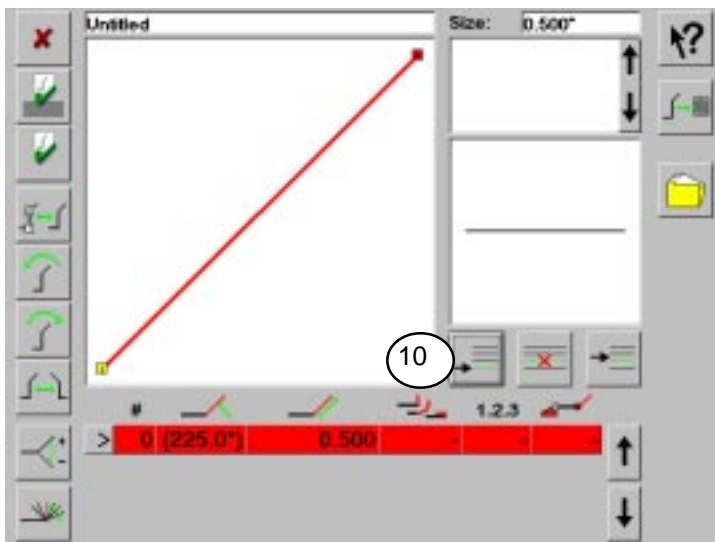
GRPR029

7. Touch the decimal point Touchbutton to enter a decimal point.

8. Touch the **5** Touchbutton to entered the desired line length (**.5**). Be sure the number appears in the box at the top of the display

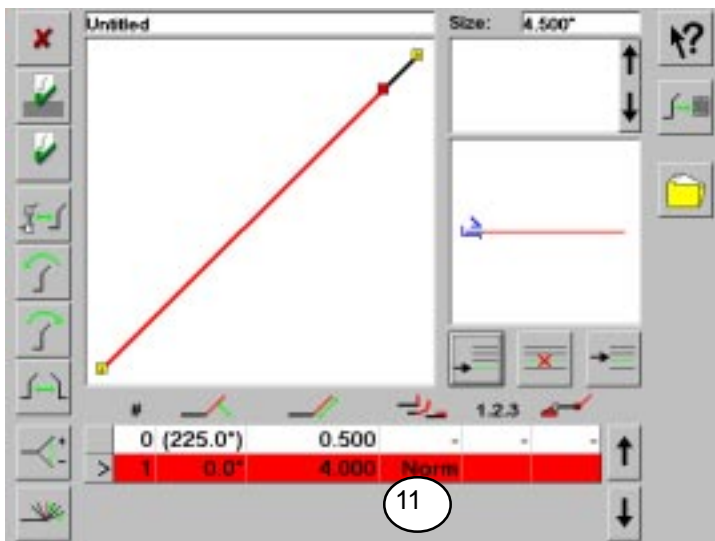
9. Touch the Enter Touchbutton to move the value **.5** to the segment length column of the Graphic Programming Screen.





GRPR030

10. Touch the Add Operation Touchbutton to add a new operation line to the Programming Screen.



GRPR093

11. The part is to have a hem along one edge. Touch the hem Column in the new program line to bring up the hem Data Pop-Up Display.



PRHEM01

12. Touch the Open Hem Touchbutton to activate the hem Data Displays.



PRHEM05

13. Using the Numeric Keypad, Enter **100** in the display box marked **POS** (this changes the maximum pressure used to 100 per cent).

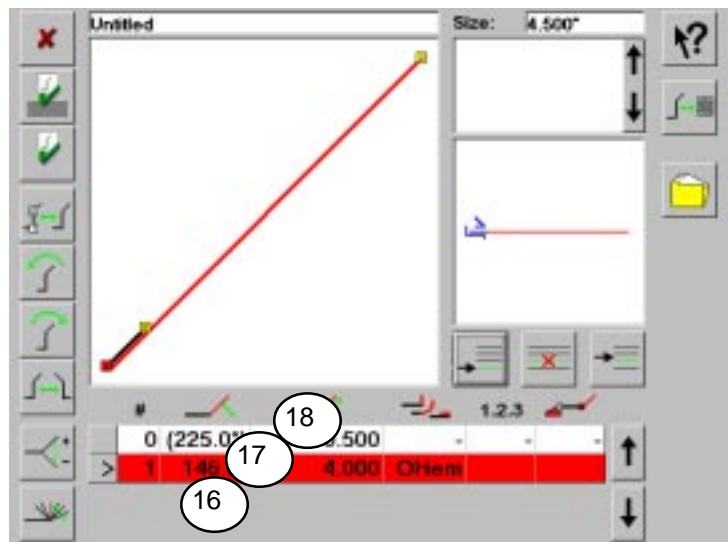
14. The default value of **0.098** in the display box marked **Move** is acceptable (this sets the backgauge position).

15. Touch the Enter Touchbutton to enter the hem data into the program.

16. Touch the bend angle column in the first bend operation.

17. Using the Numeric Keypad, enter the desired angle of **-148**. This will “swap” ends on the line.

18. Touch the Enter Touchbutton on the Keypad to move the value **-148** to the bend angle column of the Graphic Programming Screen. The results are shown.

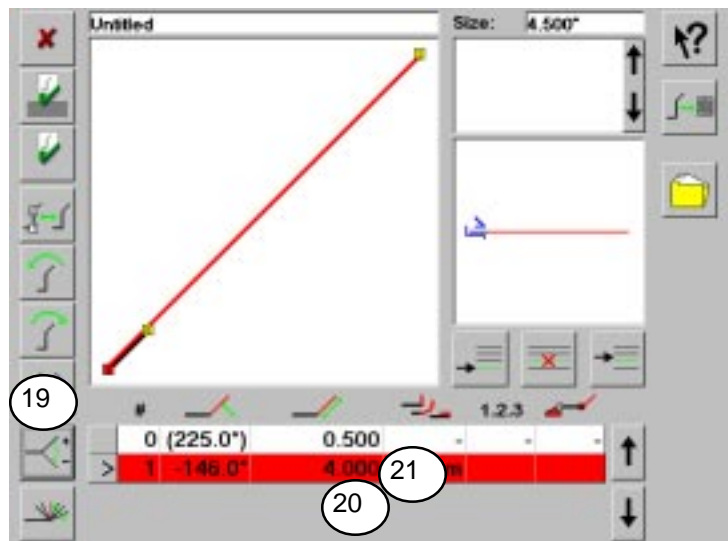


GRPR032

19. Touch the Bend Angle Toggle Touchbutton. This flips the view so that the hem lays on the other side of the drawing line. The results are shown.

20. The line segment length must be changed. Touch the Line Length box in the first bend operation line to bring up the Graphic Keypad.

21. Using the Graphic Keypad, enter **.625** and transfer it to the Line Length Box in the Programming Screen.

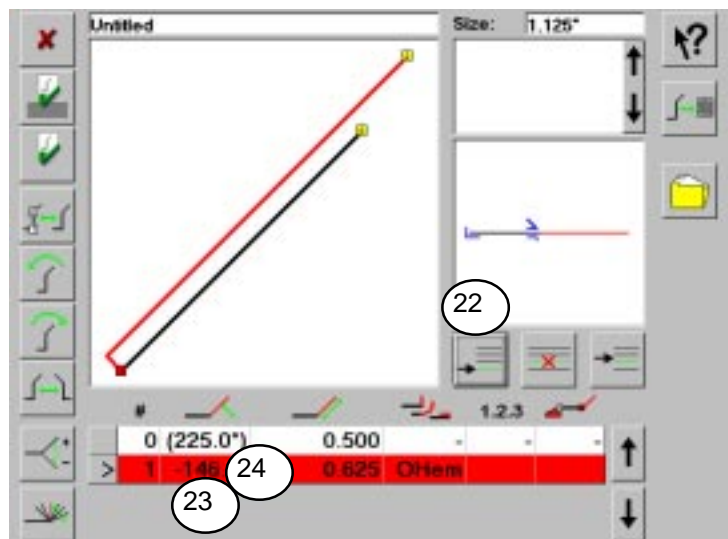


GRPR033

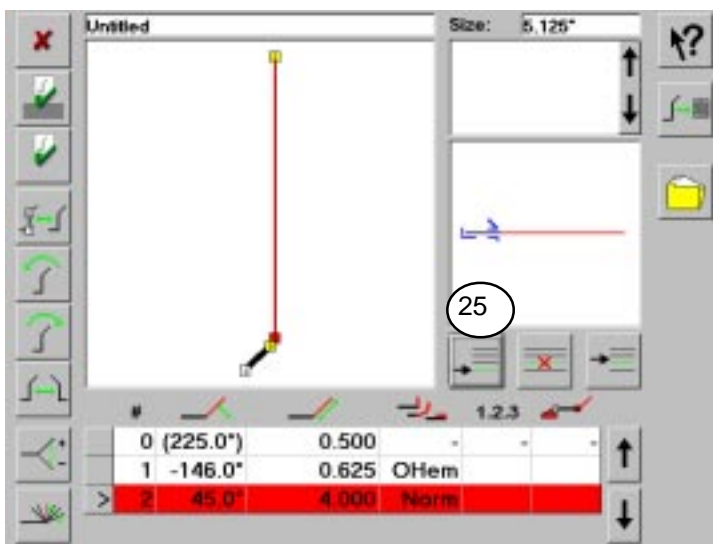
22. Touch the Add Operation Touchbutton to add another operation line to the Programming Screen.

23. The bend angle must be changed. Touch the bend angle box in the new line to bring up the Graphic Keypad.

24. Using the Graphic Keypad, enter **45** and transfer it to the bend angle Box in new line on the Programming Screen.

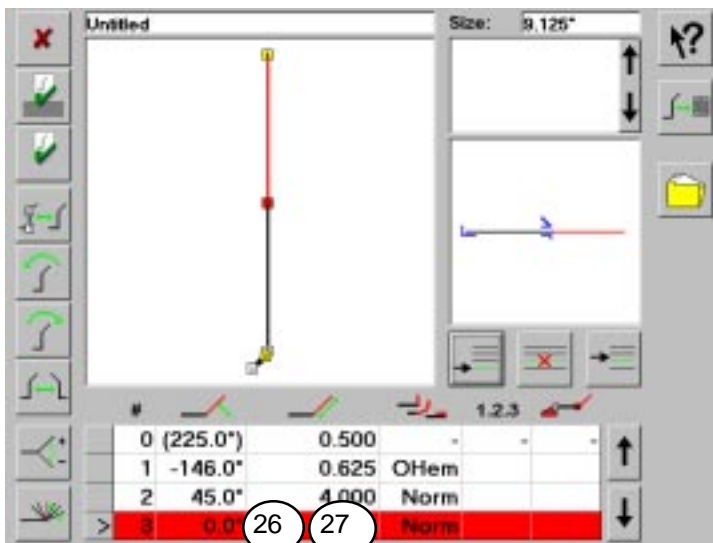


GRPR034



GRPR044

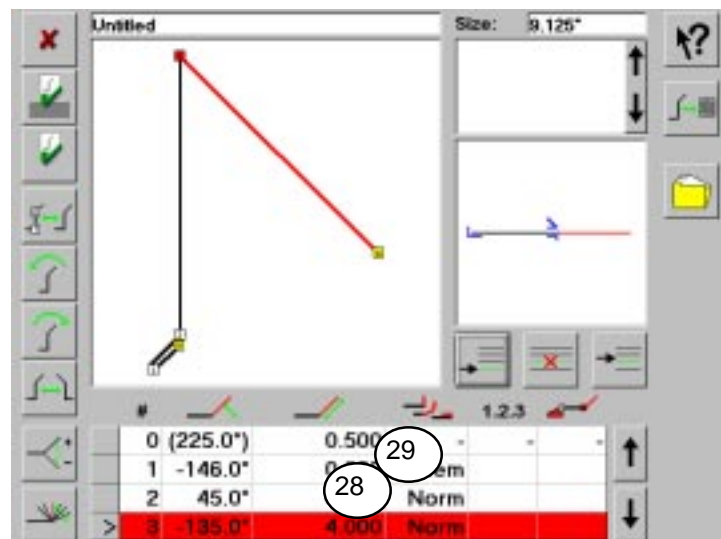
25. Touch the Add Operation Touchbutton to add another operation line to the Programming Screen.



GRPR094

26. The bend angle must be changed. Touch the bend angle box in the new line to bring up the Graphic Keypad.

27. Using the Graphic Keypad, enter the value **-135** and transfer it to the bend angle Box in new line on the Programming Screen.

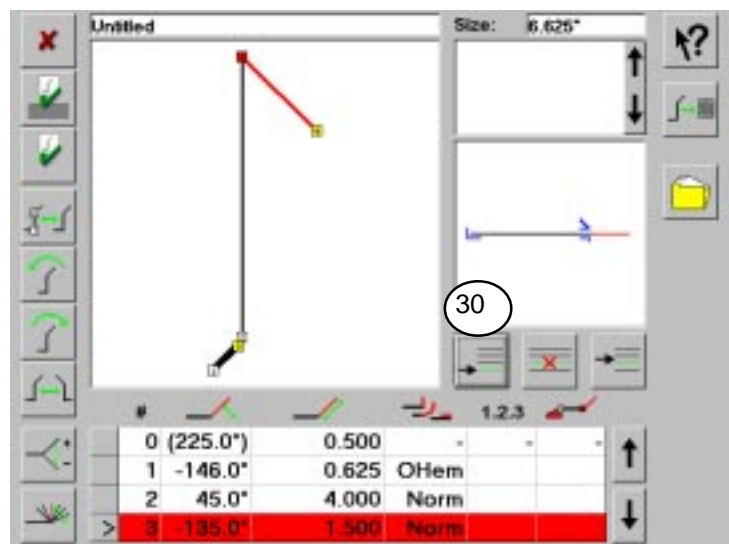


GRPR045

28. The line segment length must be changed. Touch the Line Length box in the first bend operation line to bring up the Graphic Keypad.

29. Using the Graphic Keypad, enter **1.5** and transfer it to the Line Length Box in the Programming Screen.

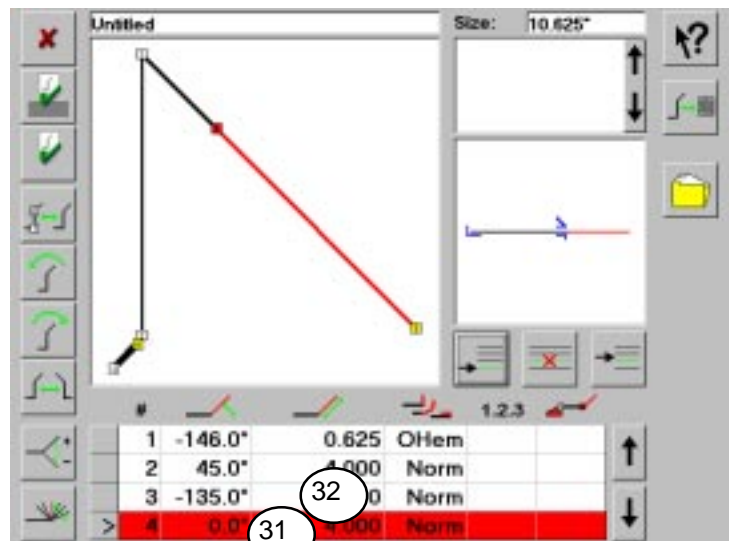
30. Touch the Add Operation Touchbutton to add another operation line to the Programming Screen.



GRPR046

31. The bend angle must be changed. Touch the bend angle box in the new line to bring up the Graphic Keypad.

32. Using the Graphic Keypad, enter the value **45** and transfer it to the bend angle Box in new line on the Programming Screen.



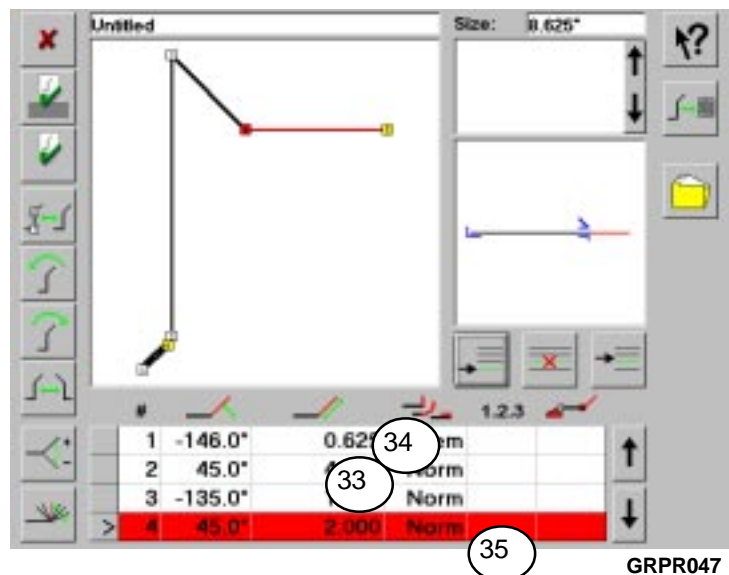
GRPR095

33. The line segment length must be changed. Touch the Line Length box in the bend operation line to bring up the Graphic Keypad.

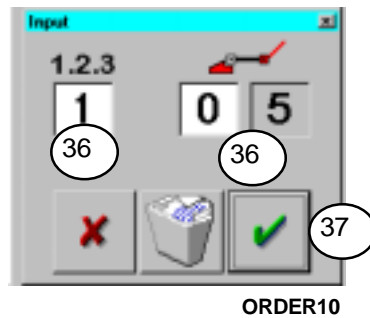
34. Using the Graphic Keypad, enter **2.0** and transfer it to the Line Length Box in the Programming Screen. The results are shown.

Preparation of the part drawing is now complete. The bend order for the part program must now be established.

35. Touch the box in the Operation 4 line under the bend order symbol. The line representing Operation 4 will highlight in red, and the the Bend Order Pop-Up Display will appear.

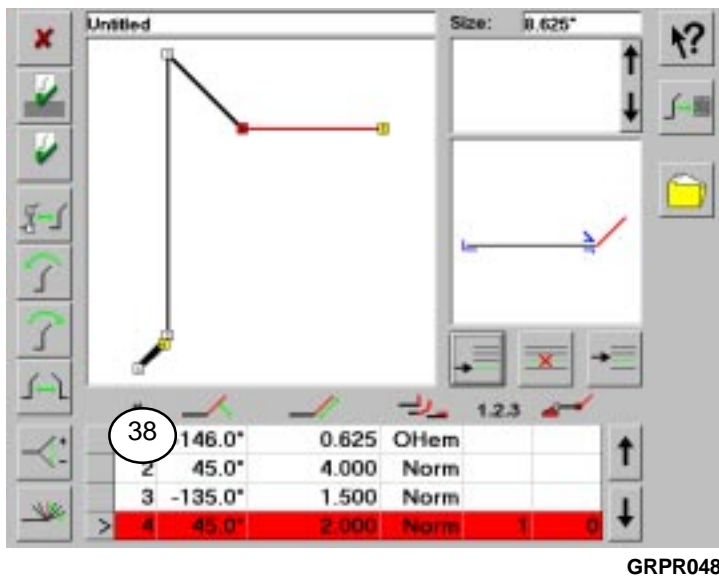


GRPR047



36. The Part Location Pop-Up Display shows that it will set the back gauge position for the part in what will become the first bend operation. It gives alternative location points (against the back gauge) for the operation of **0** or **5**.

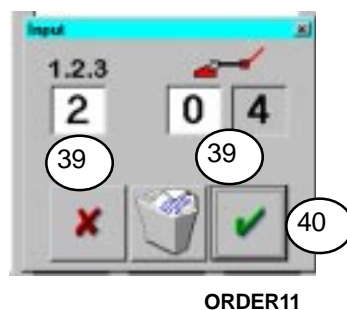
37. **0** is highlighted and this is appropriate. Enter the values shown by touching the Enter Touchbutton.



NOTE:

The part profile was generated as a progression, moving from one segment to the next. This doesn't necessarily represent the bend order. The bend order is generated by identifying which line is the first operation, which is the second, etc.

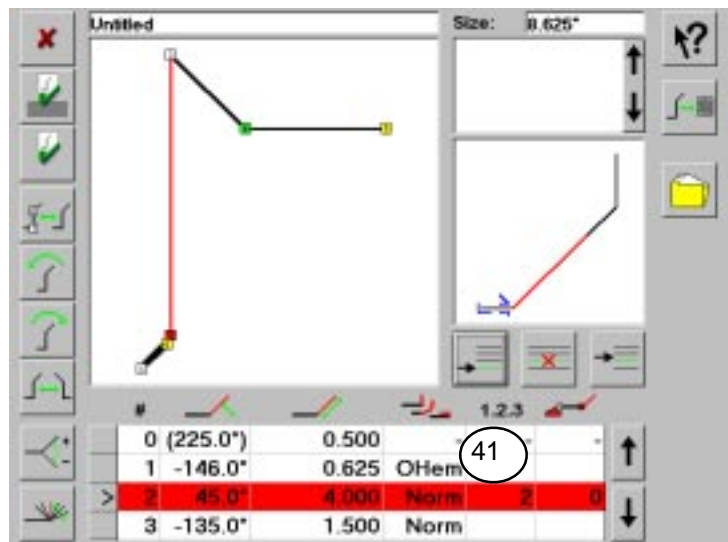
38. Touch the box in the Operation 2 line under the part location symbol. The line representing Operation 2 will highlight in red, and the the Part Location Pop-Up Display will appear



39. The Part Location Pop-Up Display shows that it will set the location for the part in what will become the second bend operation. It gives alternative location points (against the back gauge) for the operation of **0** or **4**.

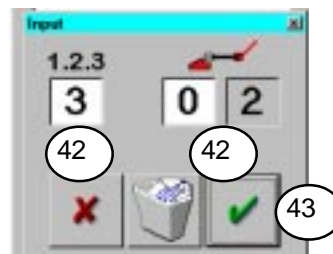
40. **0** is highlighted and this is appropriate. Enter the values shown by touching the Enter Touchbutton.

41. Touch the box in the Operation 1 line under the part location symbol. The line representing Operation 1 will highlight in red, and the the Part Location Pop-Up Display will appear



GRPR049

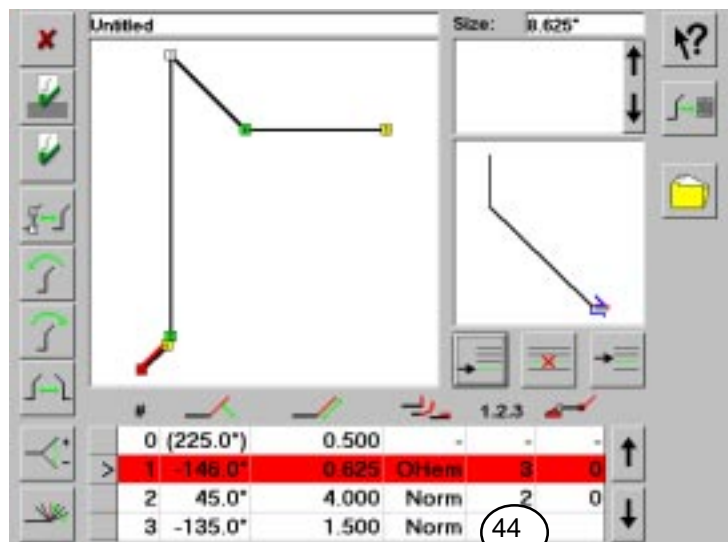
42. The Part Location Pop-Up Display shows that it will set the location for the part in what will become the third bend operation. It gives alternative location points (against the back gauge) for the operation of 0 or 2.



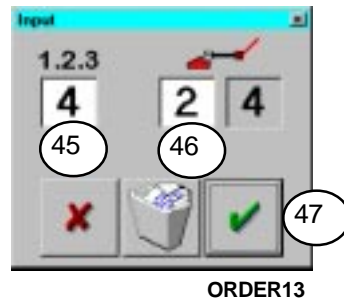
ORDER12

43. 0 is highlighted and this is appropriate. Enter the values shown by touching the Enter Touchbutton.

44. Touch the box in the Operation 3 line under the part location symbol. The line representing Operation 3 will highlight in red, and the the Part Location Pop-Up Display will appear



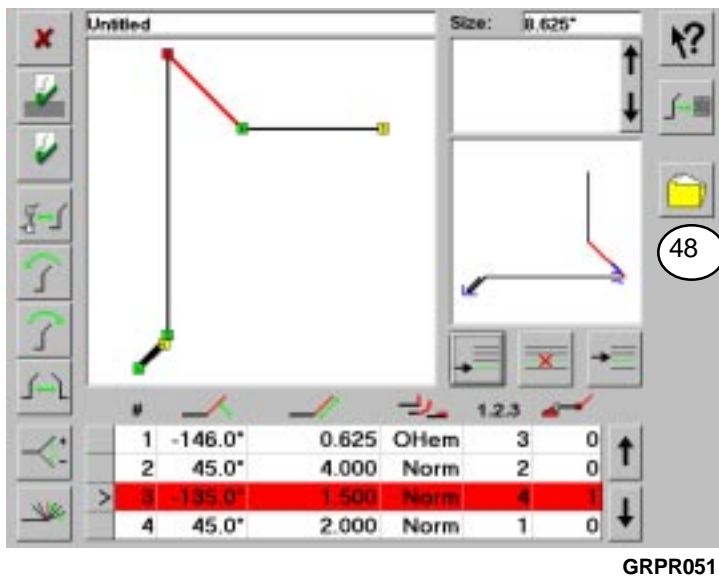
GRPR050



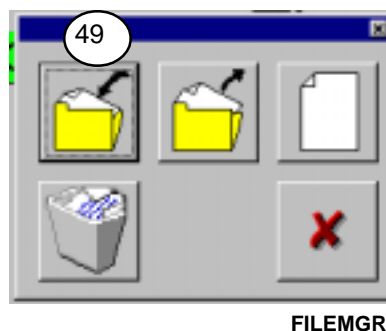
45. The Part Location Pop-Up Display shows that it will set the location for the part in what will become the fourth bend operation. It gives alternative location points for the operation of **2** or **4**.

46. **2** is highlighted and neither is appropriate. Touch the box showing 2 for the location, and the Numeric Pop-Up Display will appear. Enter 1 on the display and transfer it to the part Location Pop-Up Display by touching the Enter Touchbutton on the Numeric Pop-Up Display.

47. Enter the values shown by touching the Enter Touchbutton on the Part Location Pop-Up Display..

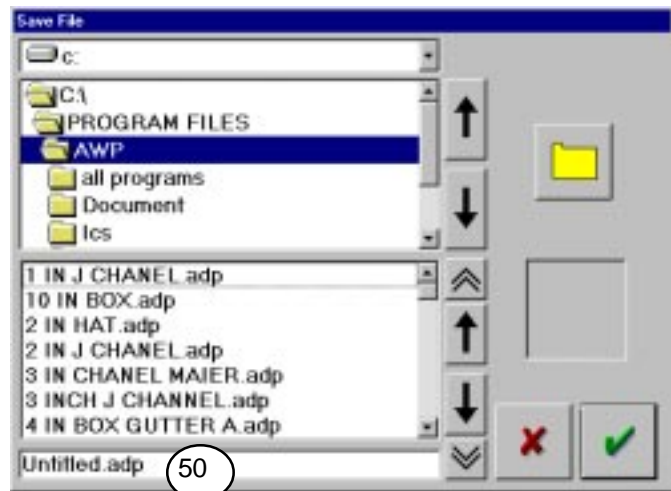


48. The drawing portion of the graphic programming file is now ready to be saved. Touch the File Manager touchbutton in the Graphic Programming Screen. This will bring up the File Manager Pop-Up Display.



49. Touch the Save File Touchbutton in the File Manager Pop-Up Display. This will bring up the Program Selection Display.

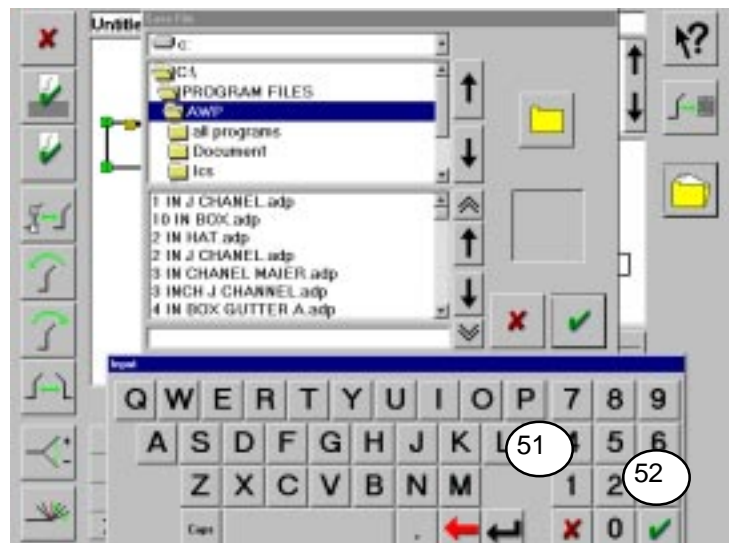
50. Touch the Program Title Display, which reads “**Untitled.adp**”. This will bring up the Alpha-Numeric Keypad.



SAVFIL01

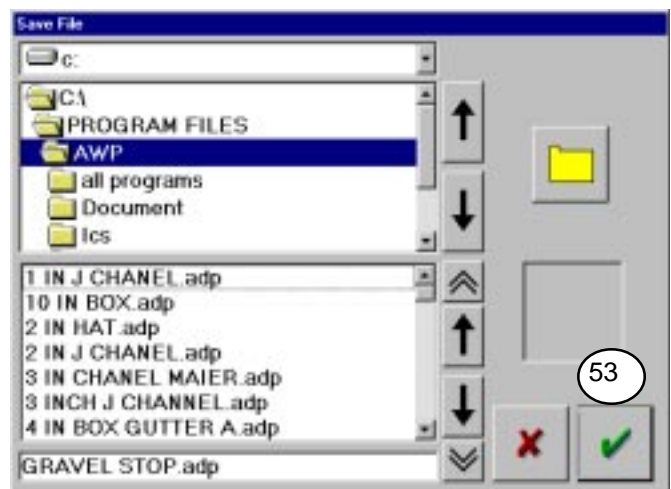
51. Enter a drawing name using the Alpha-Numeric Touchbuttons. As the characters are entered, they will appear in the Program Title Display.

52. When the name has been entered, touch the Enter Touchbutton. The Alpha-Numeric keypad will disappear, and the extension **.adp** will appear behind the name in the Program Title Display. This extension identifies the file as a drawing file.

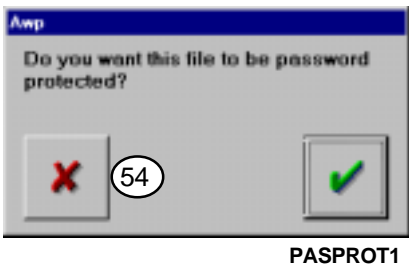


SAVFIL02

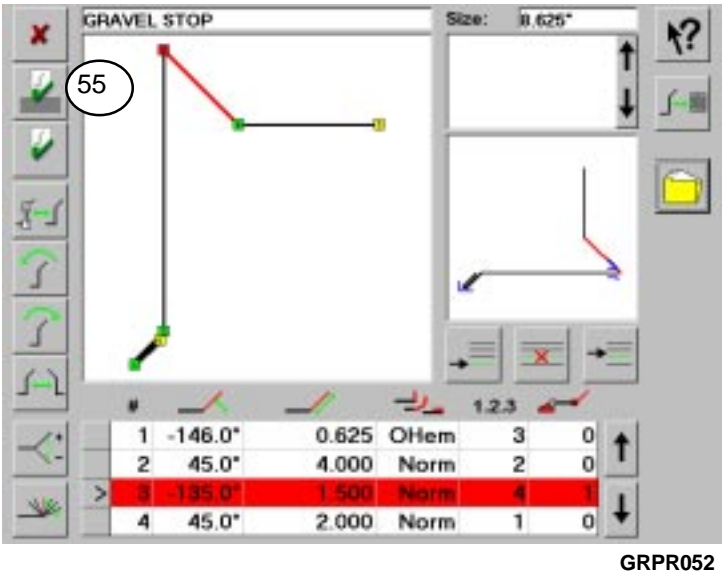
53. Touch the Enter Touchbutton in the Program Selection Display. At this point you **may** be asked if you wish to protect the file with a password.



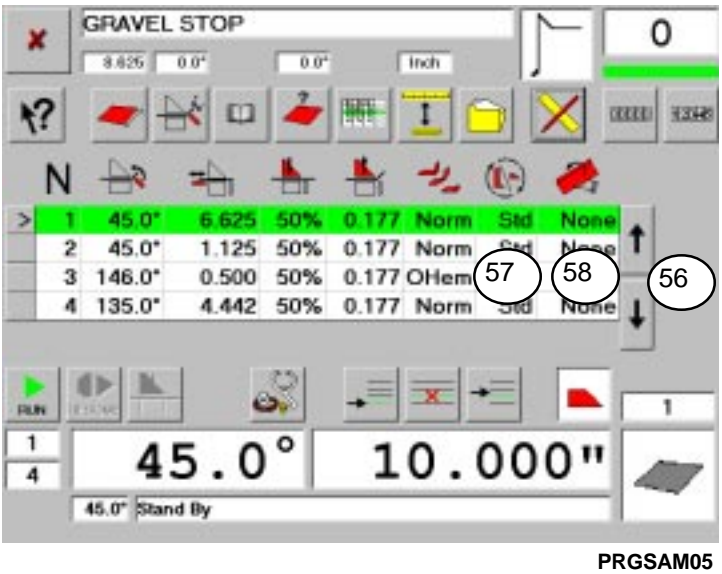
SAVFIL07



54. Normally files are not password protected. Touch the Cancel Touchbutton to proceed with programming without assigning a password.



55. The program must now be completed by specifying tooling and material handling, and by adjusting any other details generated by the automatic programming features of the graphic programming system. Touch the Create Program Touchbutton to bring up the Run/Programming screen.

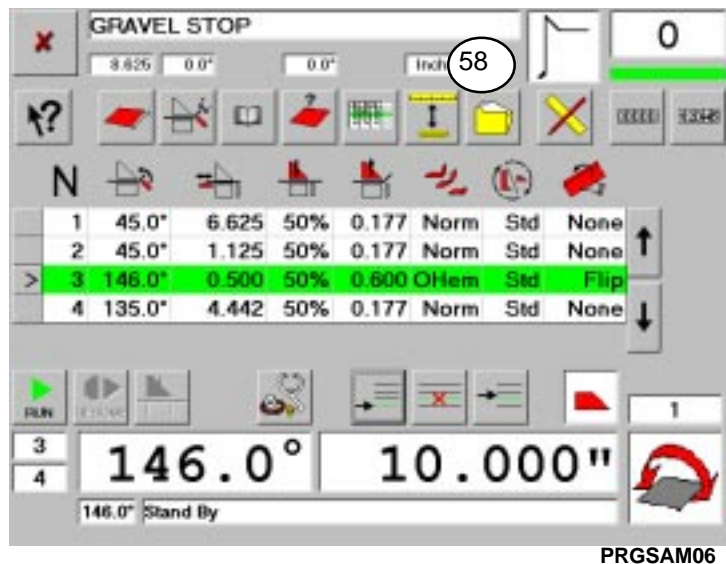


56. Scroll through the program steps.

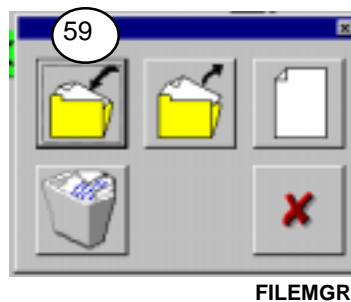
57. At each step, touch the box under the Tooling Symbol to bring up the Tooling Selection Pop-Up Display, and, if necessary, select the proper tooling for the operation. Normally a Gravel Stop will use standard tooling throughout.

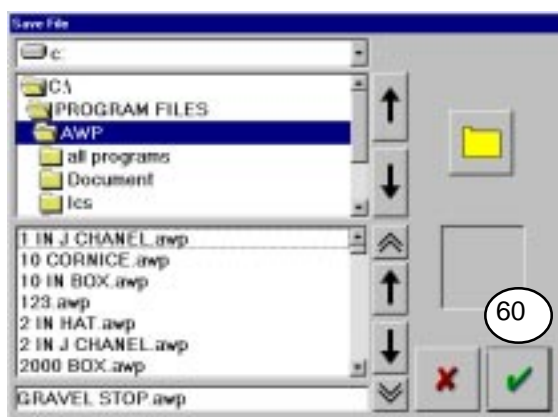


58. The program is now ready for its final save. Touch the File Manager Touchbutton to bring up the File Manager Pop-Up Display



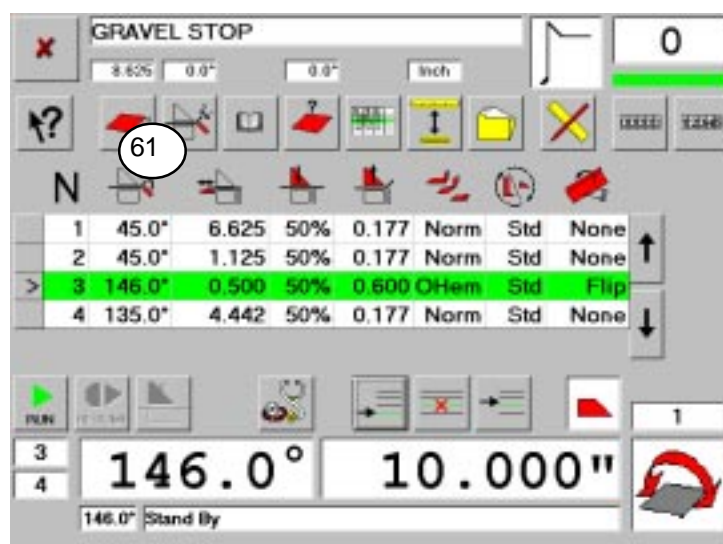
59. Touch the Save File Touchbutton. This will bring up the File Selection Display.





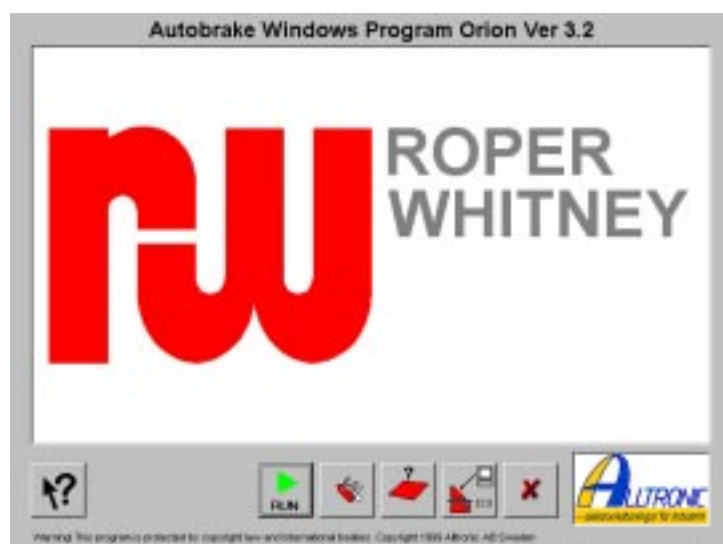
SAVFIL08

60. Touch the Enter Touchbutton. This will add the **.awp** extension to the file name and save the file to the hard drive. The **.awp** extension indicates that the file is a finished program.



PRGSAM06

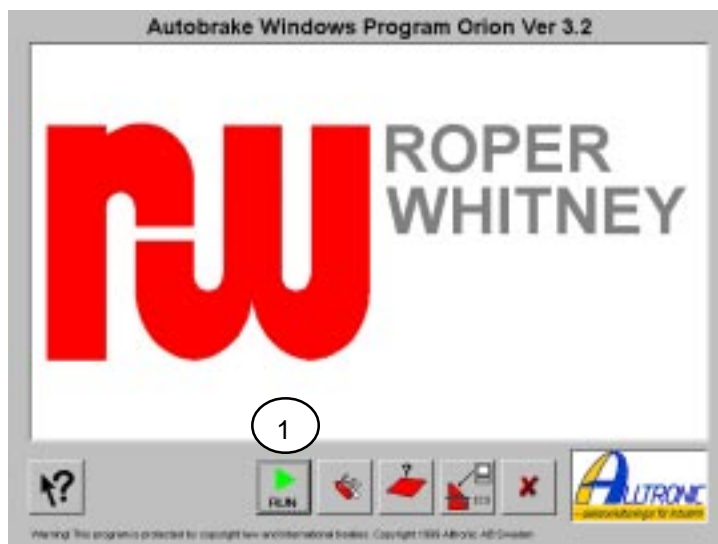
61. To return to the Main Screen, touch the Cancel Touchbutton.



MAINSR

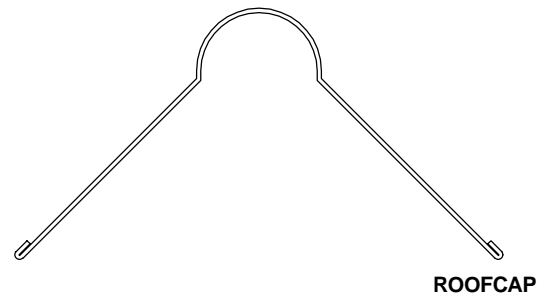
At this point, the system is ready for additional programming, or for operation.

Intentionally blank.
Please continue.

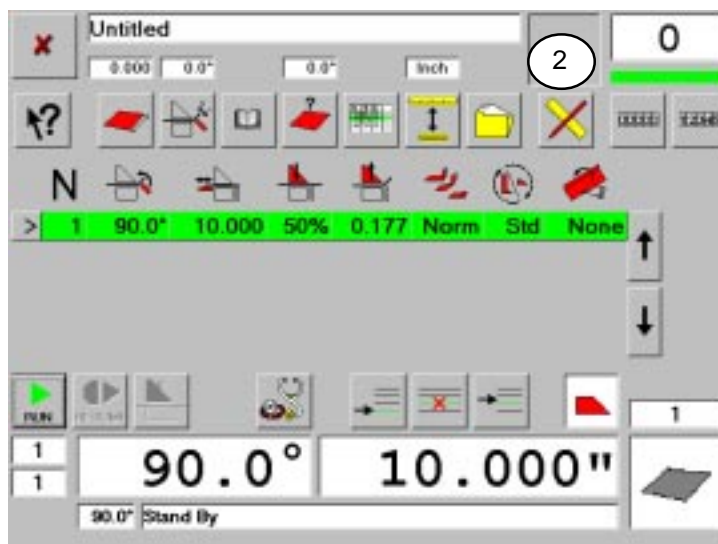


MAINSR

GRAPHIC PROGRAMMING EXAMPLE ROOF CAP

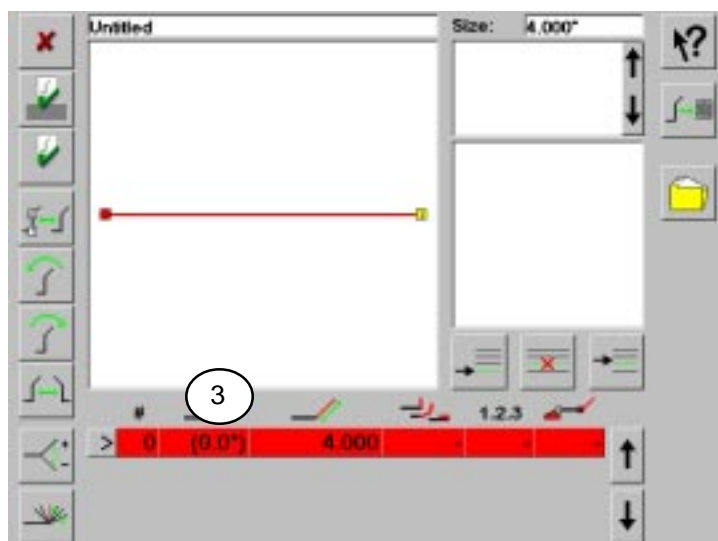


1. Touch the Run/Programming Touchbutton to bring up the Run/Programming Screen.



RUNPROG

2. Touch the Graphic Programming Touchbutton to bring up the Graphic Programming Screen.



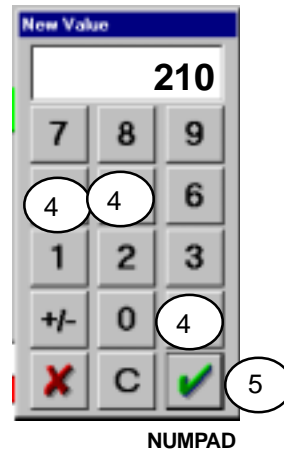
GRPR001

The programmer wishes to start programming with the line at an angle.

3. Touch the angular value **0.0** to bring up the Numeric Keypad.

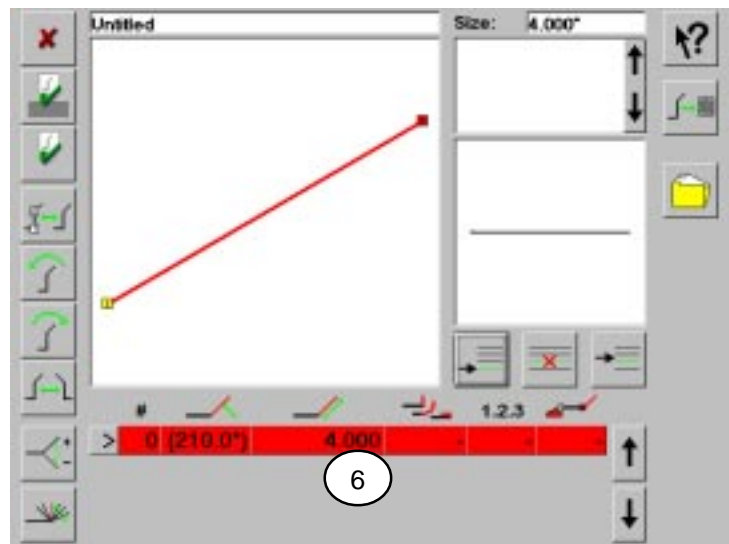
4. Touch the 2, 1, and 0 Touchbuttons to enter the desired angle (**210°**). Be sure the number appears in the box at the top of the display. This also swaps ends in preparation for making a hem at the edge of the material.

5. Touch the Enter Touchbutton to move the value **210** to the bend angle column of the Graphic Programming Screen.



The default line length for the first line segment must also be modified.

6. Touch the value **4.000** to bring up the Numeric Keypad.

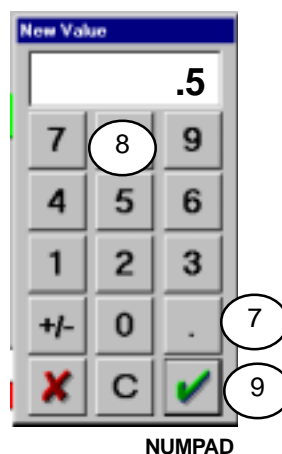


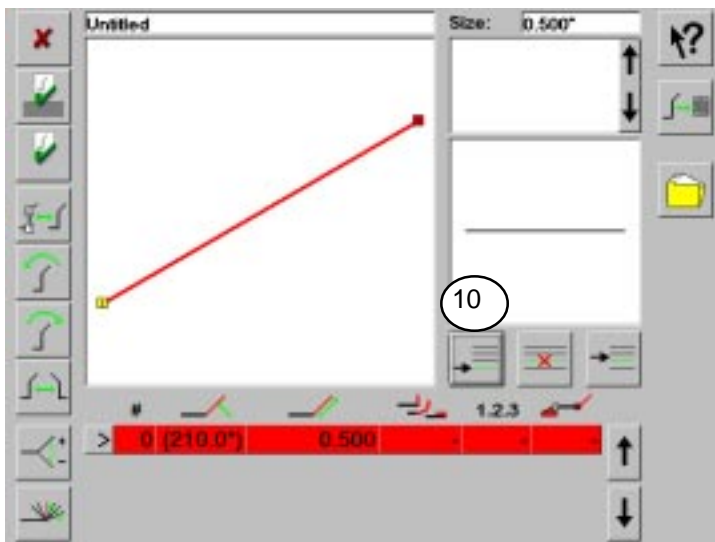
GRPR053

7. Touch the decimal point Touchbutton to enter a decimal point.

8. Touch the 5 Touchbutton to entered the desired line length (**.5**). Be sure the number appears in the box at the top of the display

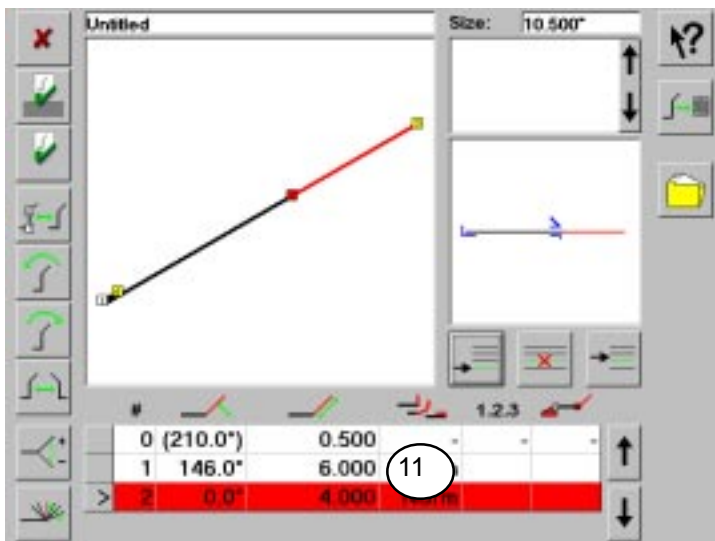
9. Touch the Enter Touchbutton to move the value **.5** to the segment length column of the Graphic Programming Screen.





GRPR054

10. Touch the Add Operation Touchbutton to create a second program line. The part is to have a hem along one edge



GRPR096

11. Touch the hem Column in the second program line to bring up the hem Data Pop-Up Display.



PRHEM01

12. Touch the Open Hem Touchbutton to activate the hem Data Displays.



PRHEM04

13. Using the Numeric Keypad, Enter .098 in the display box marked **Pos** (this sets the open height of the hem).

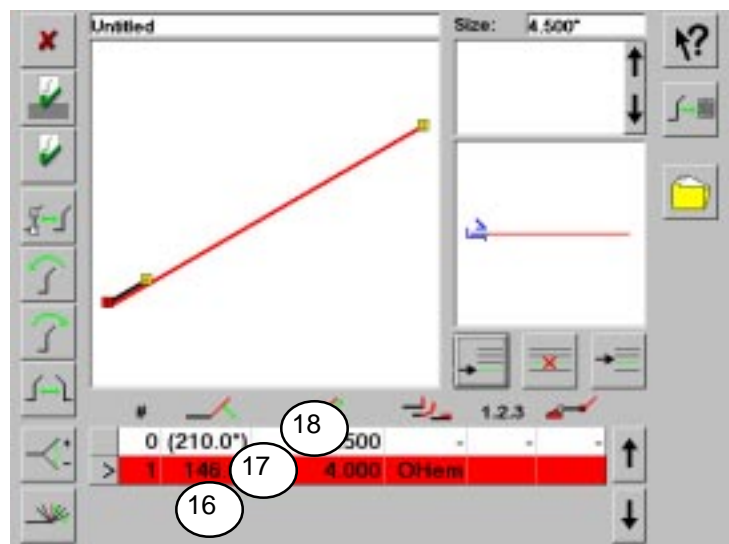
14. Enter .079 in the display box marked **Move** (this sets the backgauge position).

15. Touch the Enter Touchbutton to enter the hem data into the program.

16. Touch the bend angle column in the first bend operation.

17. Using the Numeric Keypad, enter the desired angle of **146**. This will “swap” ends on the line.

18. Touch the Enter Touchbutton on the Keypad to move the value **146** to the bend angle column of the Graphic Programming Screen. The results are shown.

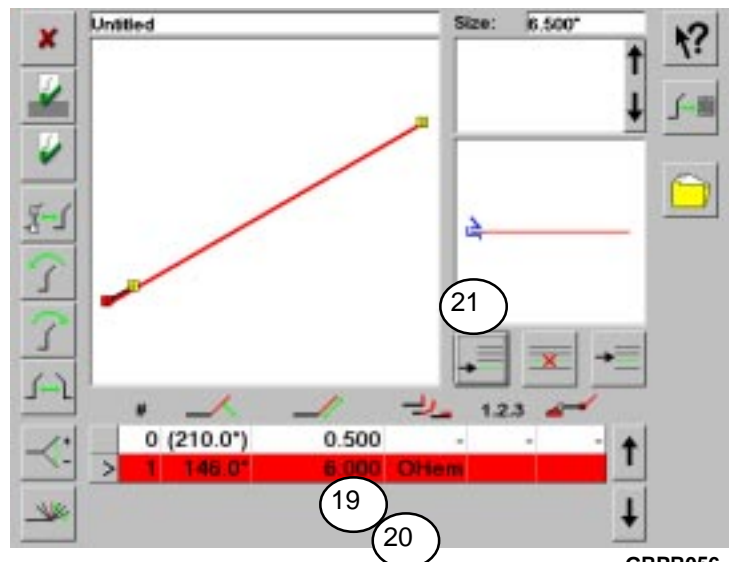


GRPR055

19. The line segment length must be changed. Touch the Line Length box in the hem operation line to bring up the Graphic Keypad.

20. Using the Numeric Keypad, enter **6.000** and transfer it to the Line Length Box in the Programming Screen.

21. Touch the Add Operation Touchbutton to add another operation to the Programming Screen. This will be the first bending operation after forming the hem.

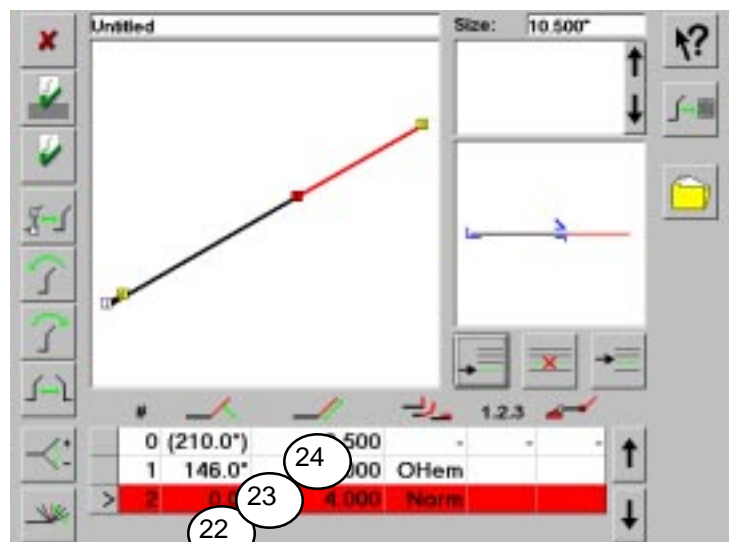


GRPR056

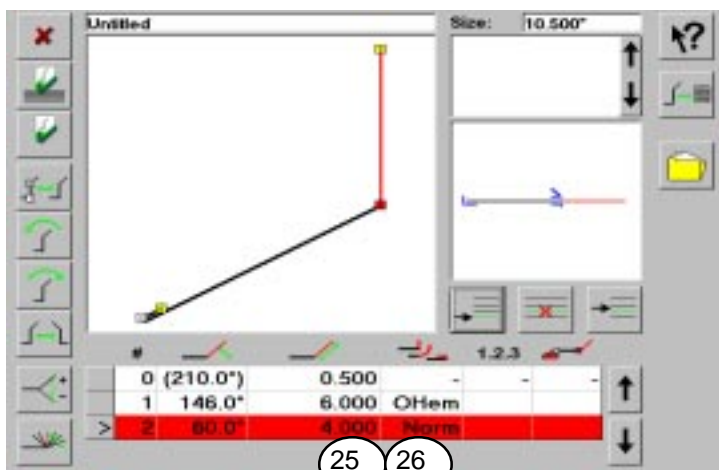
22. Touch the Bend Angle Box in the new operation line. This will bring up the Numeric Keypad again, this time to enter the bend angle.

23. Enter **60** using the Numeric Keypad.

24. Transfer the value **60** to the Bend Angle Box in the Programming Screen by pressing the Enter Touchbutton.



GRPR057



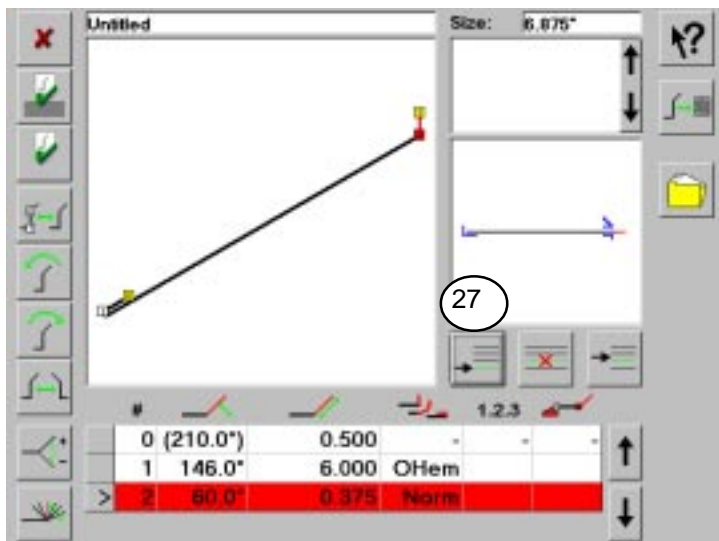
GRPR058

25. Touch the Line Length Box in the operation line to bring up the Graphic Keypad.

26. Enter **.375** on the Graphic Keypad and transfer it to the Line Length Box by touching the Enter Touchpad.

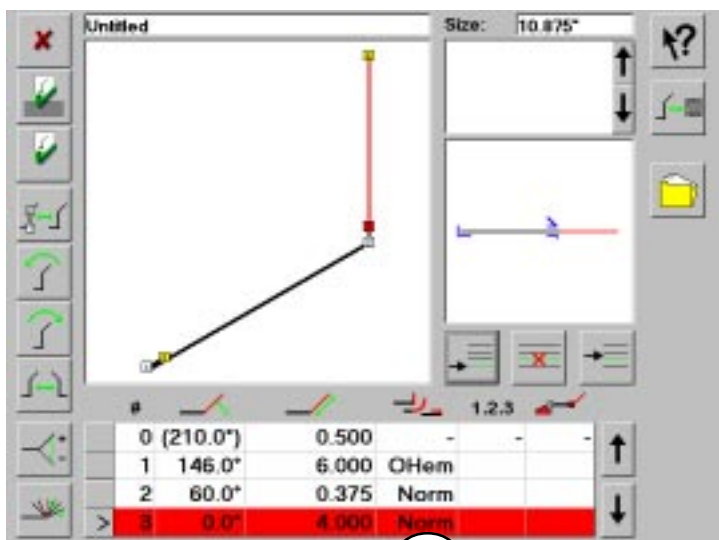
NOTE:

This line segment provides the necessary “starter” line segment for the next line segment, which will become the radius bend which follows.



GRPR059

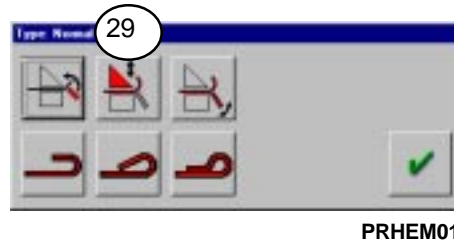
27. Touch the Add Operation Touchbutton to add another operation to the Programming Screen.



GRPR060

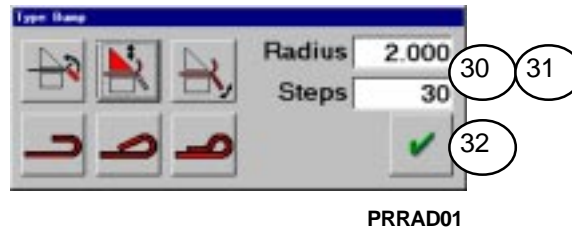
28. Touch the hem Column in the second program line to bring up the Hem Data Pop-Up Display.

29. Touch the Bump Bending Touchbutton to activate the Radius Data Displays.



30. Using the Numeric Keypad, Enter **2** in the display box marked **Radius** (this identifies the radius dimension for the bend).

31. Enter **30** in the display box marked **Steps** (this sets the numbr of bend steps used in forming the radius).



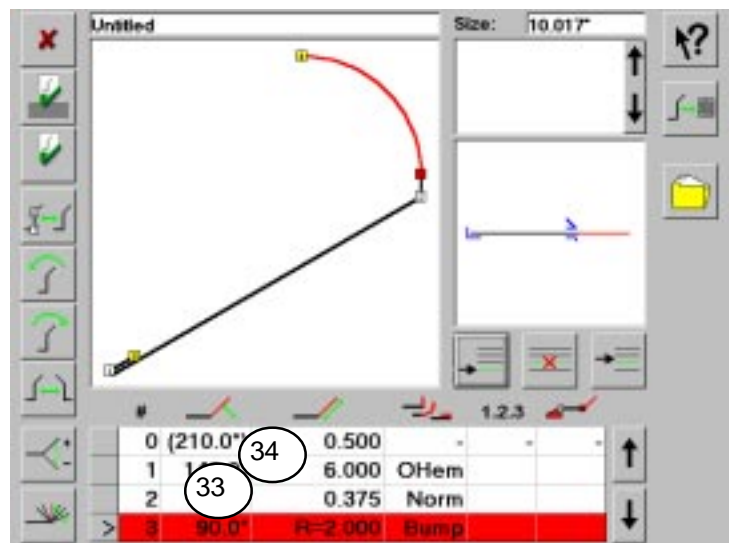
32. Touch the Enter Touchbutton to enter the radius data into the program.

NOTE:

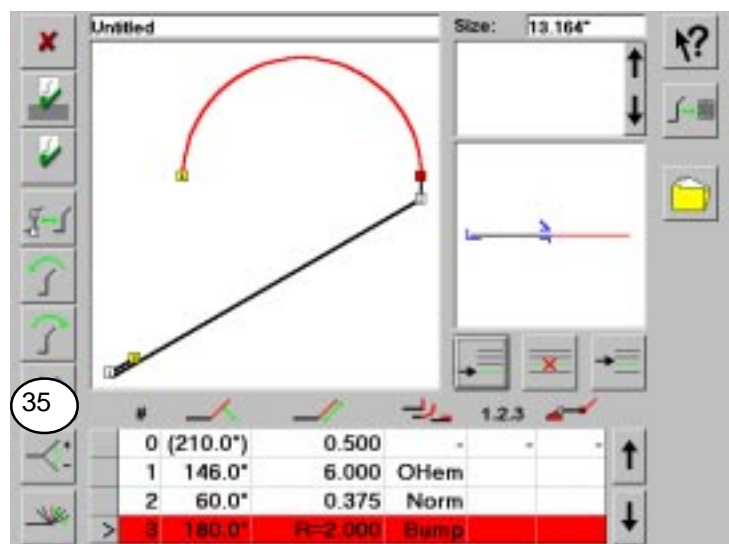
At this point the radius is neither complete nor in the right direction. Correct each deficiency separately.

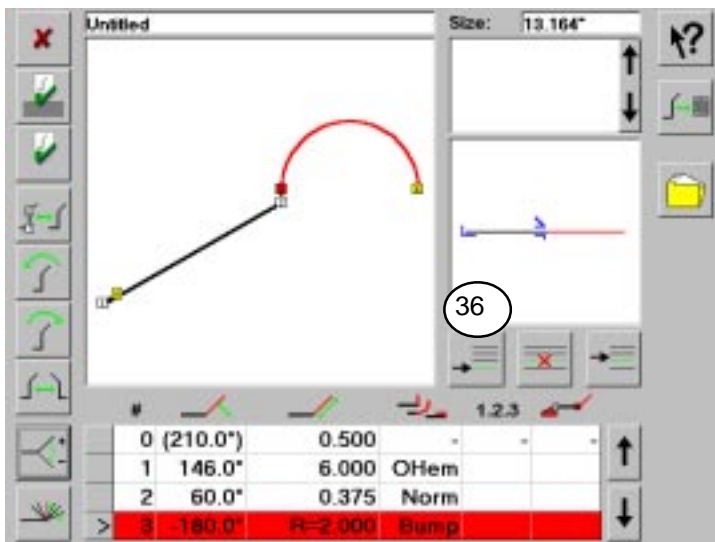
33. Touch the Bend Angle Box in the radius bend operation line.

34. Using the Graphic Keypad, enter **180** in the Bend Angle Box .



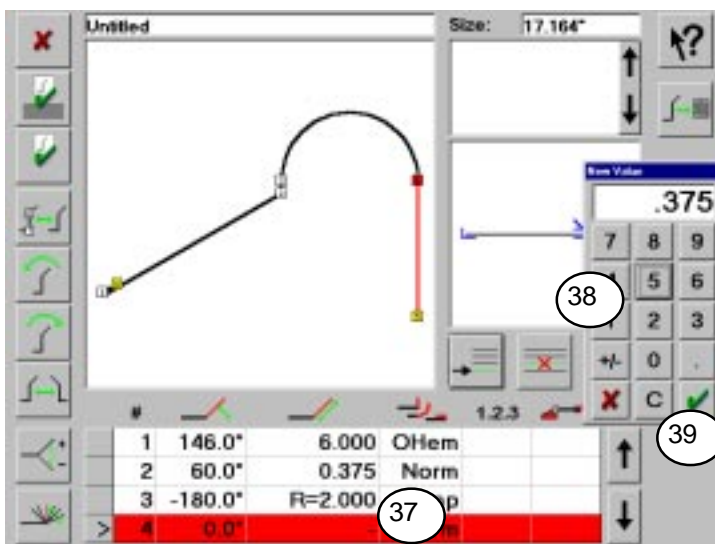
35. With the rdius bend line highlighted, touch the Bend Angle Toggle Touchbutton. This flips the radius so that it lays on the other side of the drawing.





GRPR063

36. Touch the Add Operation Touchbutton to add another operation to the Programming Screen.

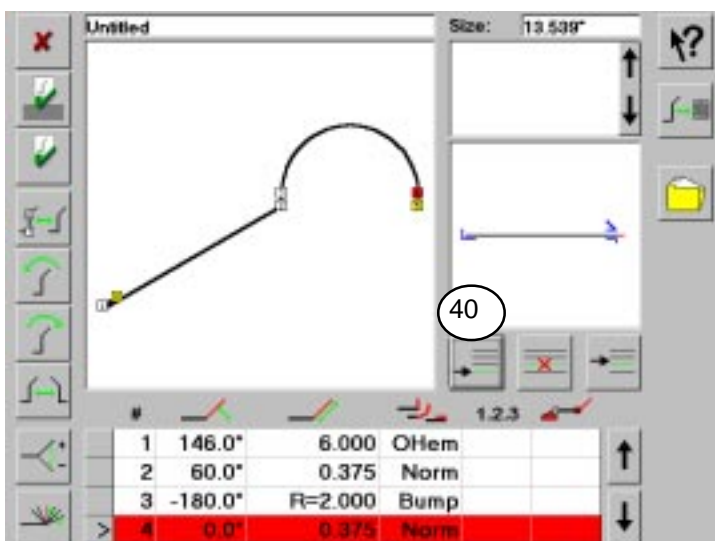


GRPR064

37. Touch the Line Length Box in the new operation line to bring up the Graphic Keypad.

38. Enter **.375** on the Graphic Keypad.

39. Transfer the value **.375** to the Line Length Box by touching the Enter Touchpad.



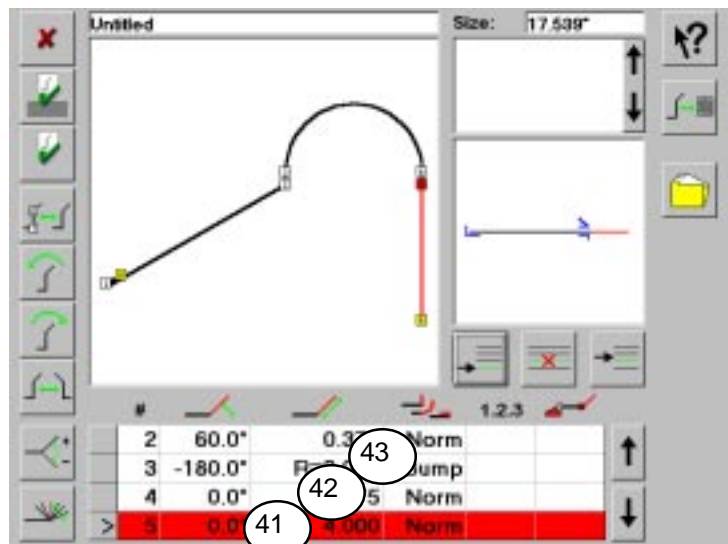
GRPR065

40. Touch the Add Operation Touchbutton to add another operation to the Programming Screen.

41. Touch the Bend Angle box in the new operation.

42. Enter **60** using the Numeric Keypad.

43. Transfer the value **60** to the Bend Angle Box in the Programming Screen by pressing the Enter Touchbutton.

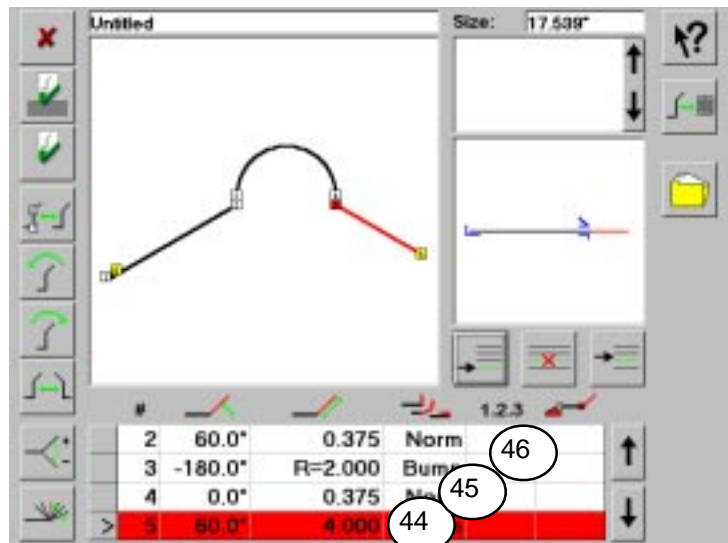


GRPRO66

44. Touch the Line Length Box in the new operation line to bring up the Graphic Keypad.

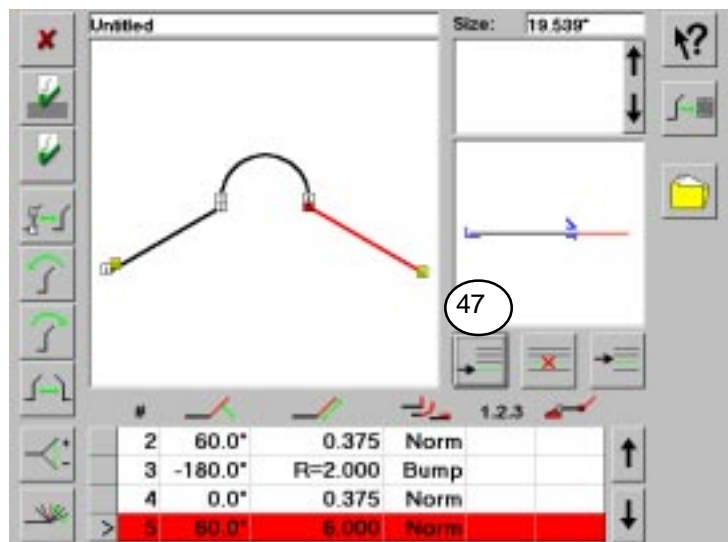
45. Enter **6** on the Graphic Keypad.

46. Transfer the value **6** to the Line Length Box by touching the Enter Touchpad.

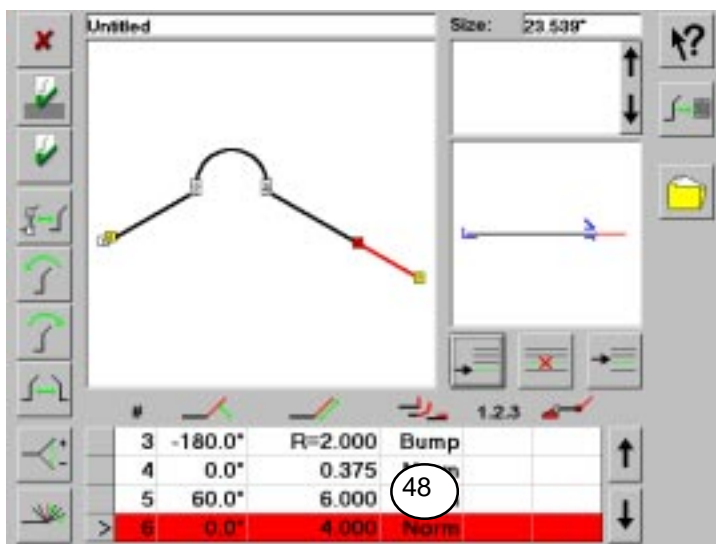


GRPRO67

47. Touch the Add Operation Touchbutton to add another operation to the Programming Screen.



GRPRO68



GRPR069

48. Touch the hem Column in the new program line to bring up the hem Data Pop-Up Display.



PRHEM01

49. Touch the Open Hem Touchbutton to activate the hem Data Displays.

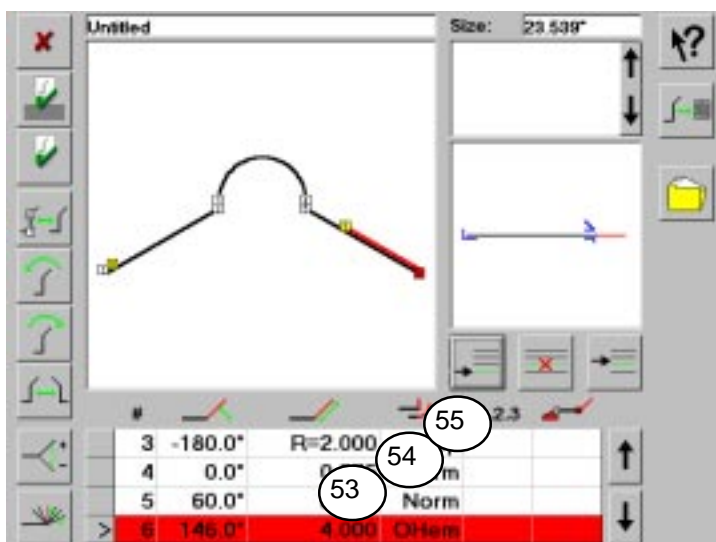


PRHEM04

50. Using the Numeric Keypad, Enter **.098** in the display box marked **POS** (this sets the open height of the hem).

51. Enter **.079** in the display box marked **Move** (this sets the backgauge position).

52. Touch the Enter Touchbutton to enter the hem data into the program.



GRPR070

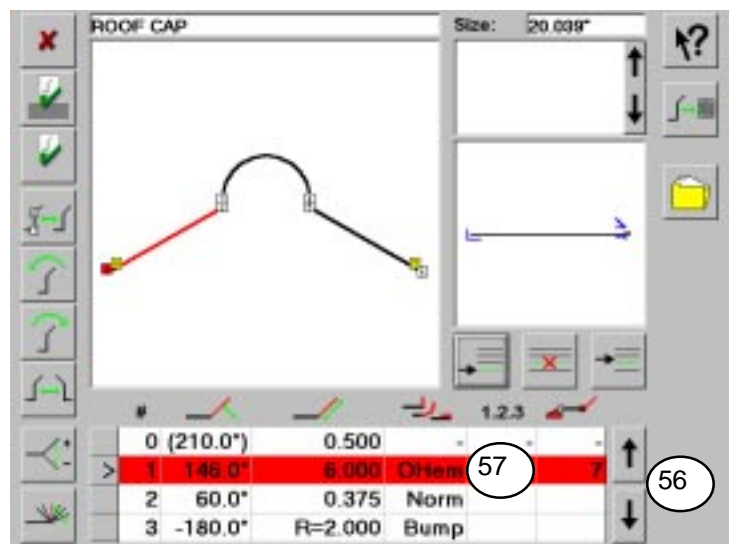
53. Touch the Line Length Box in the new operation line to bring up the Graphic Keypad.

54. Enter **.5** on the Graphic Keypad.

55. Transfer the value **.5** to the Line Length Box by touching the Enter Touchpad.

56. Scroll upward through the operation lines to bring operation 1 into view.

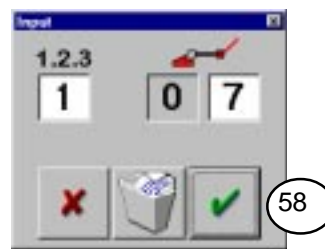
57. Touch the box in the Operation 1 line under the Bend Order symbol. The line representing Operation 1 will highlight in red, and the the Part Location Pop-Up Display will appear.



GRPR071

NOTE:

The part profile was generated as a progression, moving from one segment to the next. This doesn't necessarily represent the bend order. The bend order is generated by identifying which line is the first operation, which is the second, etc.

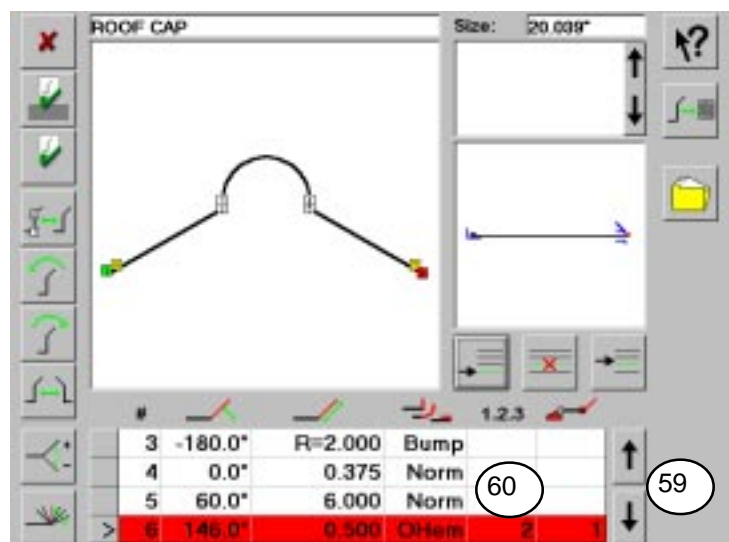


ORDER14

58. Location 7 is a suitable location point for the first bending operation. Enter it by touching the Enter Touchbutton.

59. To establish the second bend operation, scroll downward through the operation lines to bring operation 6 into view.

60. Touch the box in the Operation 6 line under the Bend Order symbol. The line representing Operation 6 will highlight in red, and the the Part Location Pop-Up Display will appear.

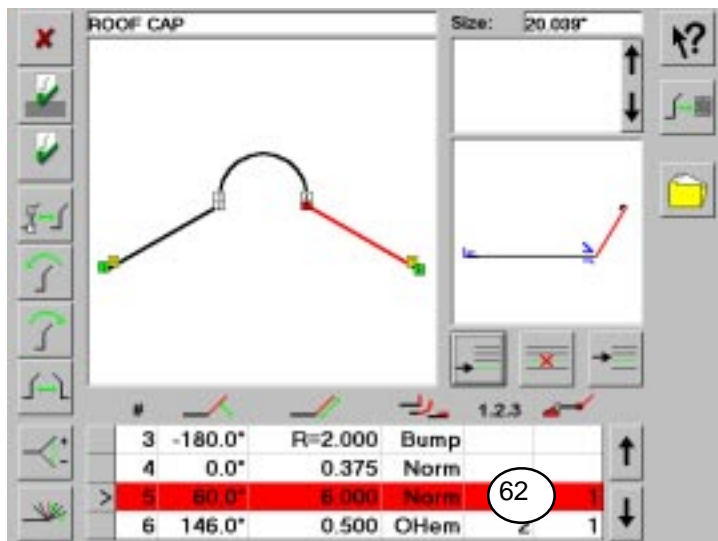


GRPR072



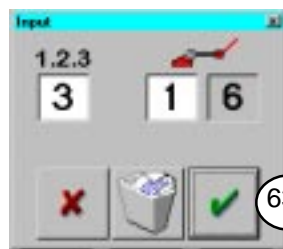
ORDER15

61. Location 1 is a suitable location point for the first bending operation. Enter it by touching the Enter Touchbutton.



GRPR073

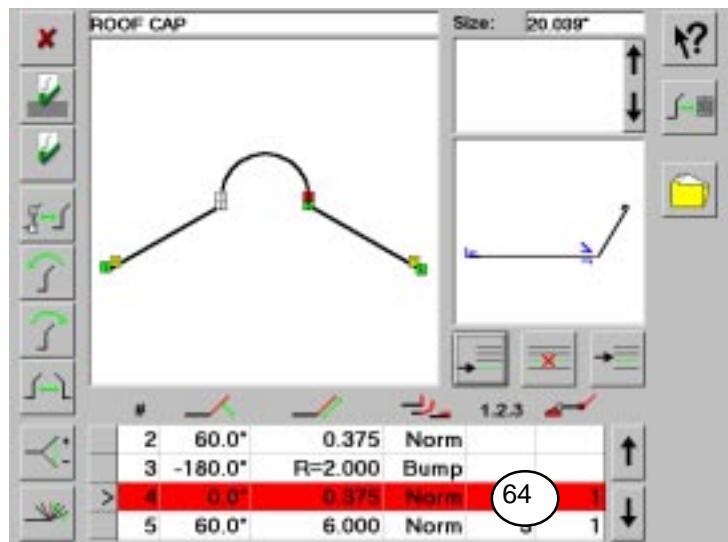
62. Touch the box in the Operation 5 line under the Bend Order symbol. The line representing Operation 5 will highlight in red, and the the Part Location Pop-Up Display will appear.



ORDER16

63. Location 1 is a suitable location point for the third bending operation. Enter it by touching the Enter Touchbutton.

64. Touch the box in the Operation 4 line under the Bend Order symbol. The line representing Operation 4 will highlight in red, and the the Part Location Pop-Up Display will appear.



GRPR074

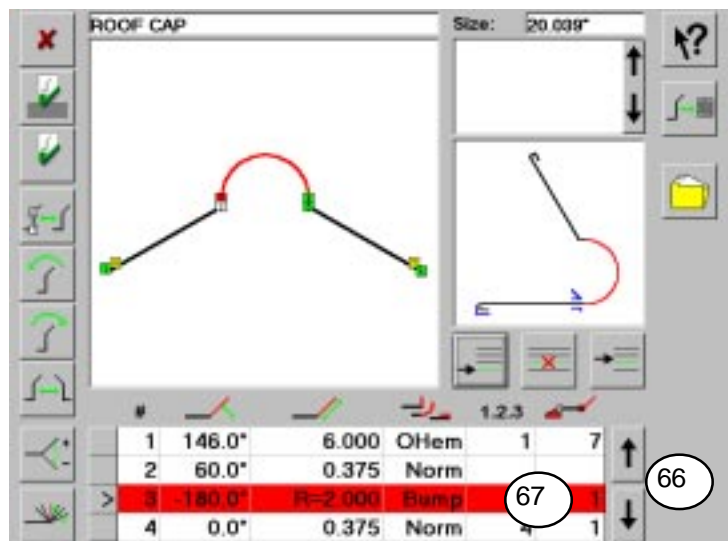
65. Location 1 is a suitable location point for the fourth bending operation. Enter it by touching the Enter Touchbutton.



ORER17

66. Scroll upward through the operation lines to bring Operations 2 and 3 into view.

67. Touch the box in the Operation 3 line under the Bend Order symbol. The line representing Operation 3 will highlight in red, and the the Part Location Pop-Up Display will appear.

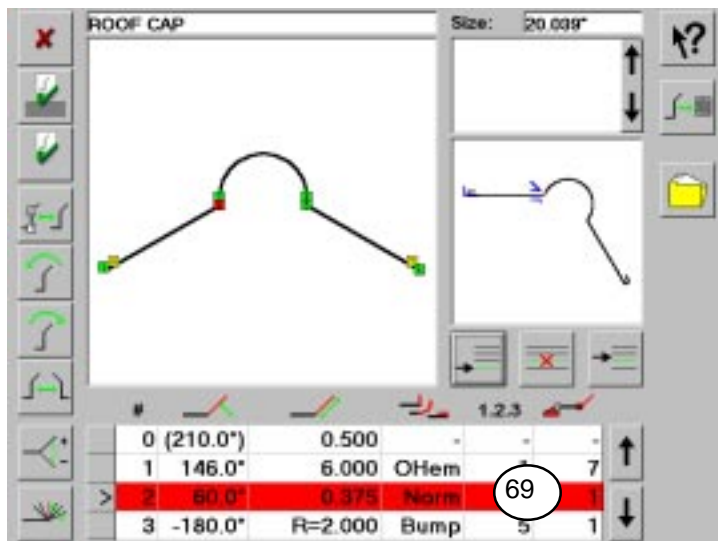


GRPR075



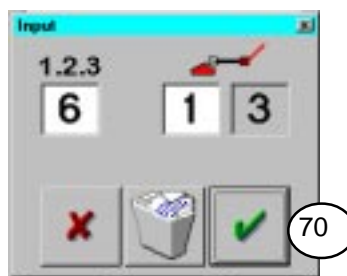
ORDER18

68. Location 1 is a suitable location point for the fifth bending operation. Enter it by touching the Enter Touchbutton.



GRPR076

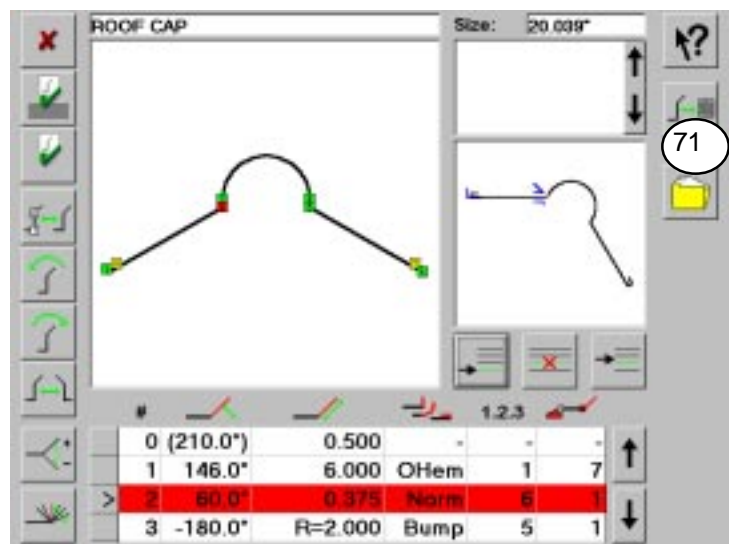
69. Touch the box in the Operation 2 line under the Bend Order symbol. The line representing Operation 2 will highlight in red, and the the Part Location Pop-Up Display will appear.



ORDER19

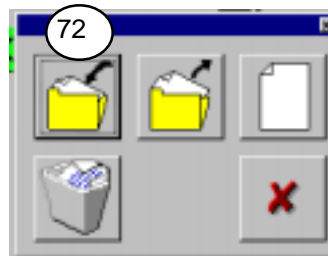
70. Location 1 is a suitable location point for the sixth bending operation. Enter it by touching the Enter Touchbutton.

71. The drawing portion of the graphic programming file is now ready to be saved. Touch the File Manager touchbutton in the Graphic Programming Screen. This will bring up the File Manager Pop-Up Display.



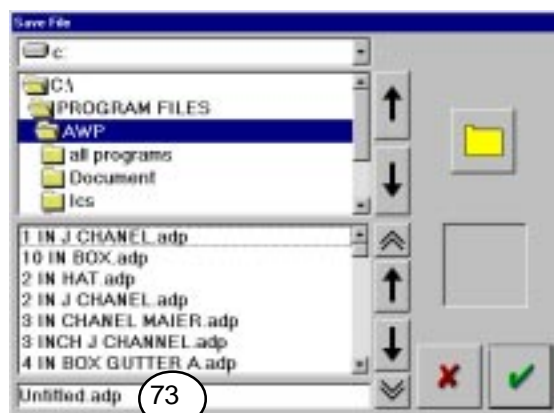
GRPR076

72. Touch the Save File Touchbutton in the File Manager Pop-Up Display. This will bring up the Program Selection Display.

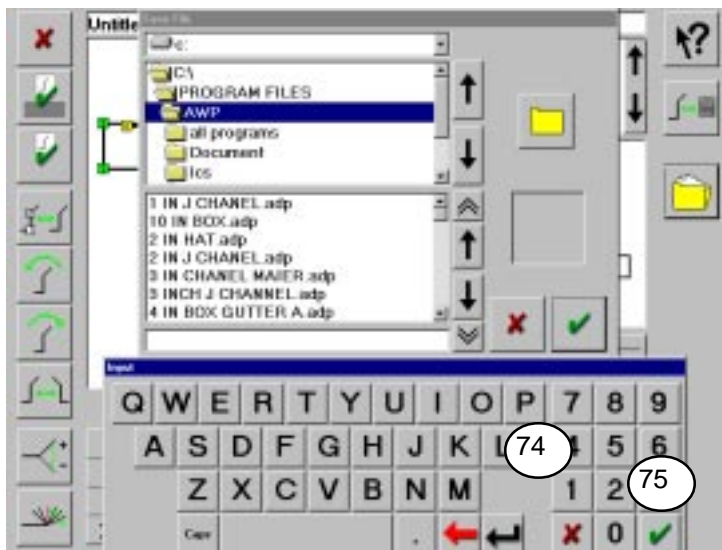


FILEMGR

73. Touch the Program Title Display, which reads "Untitled.adp". This will bring up the Alpha-Numeric Keypad.



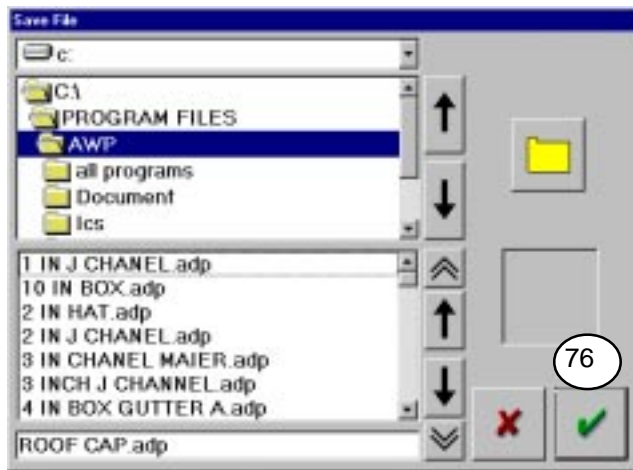
SAVFIL01



SAVFIL02

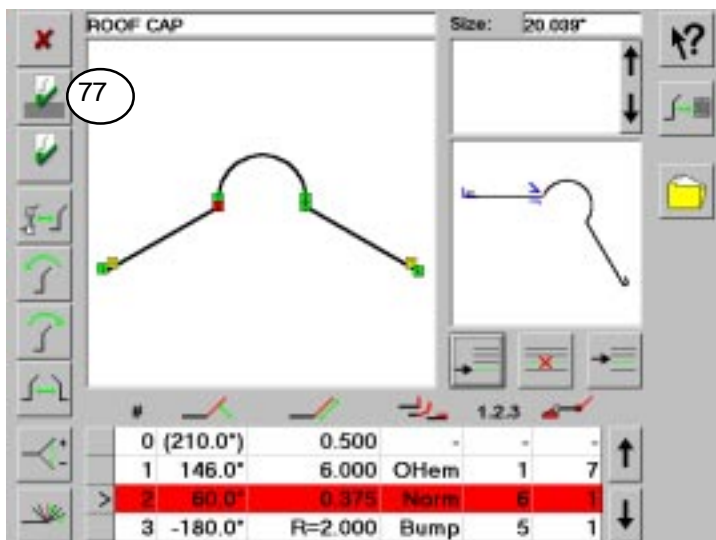
74. Enter the drawing name **ROOF CAP** using the Alpha-Numeric Touchjbuttons. As the characters are entered, they will appear in the Program Title Display.

75. When the name has been entered, touch the Enter Touchbutton. The Alpha-Numeric keypad will disappear, and the extension **,adp** will appear behind the name in the Program Title Display. This extension identifies the file as a drawing file.



SAVFIL09

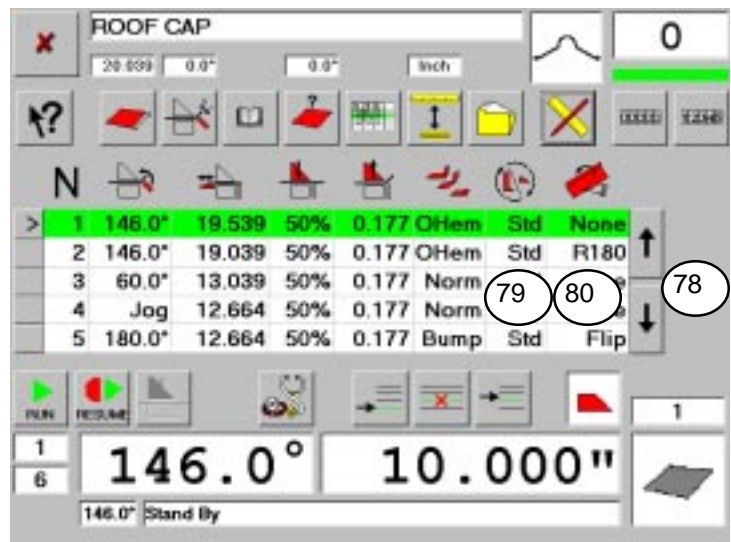
76. Touch the Enter Touchbutton in the Program Selection Display.



GRPR076

77. The program must now be completed by specifying tooling and material handling, and by adjusting any other details generated by the automatic programming features of the graphic programming system. Touch the Create Program Touchbutton to bring up the Run/Programming screen.

78. Scroll through the program steps.



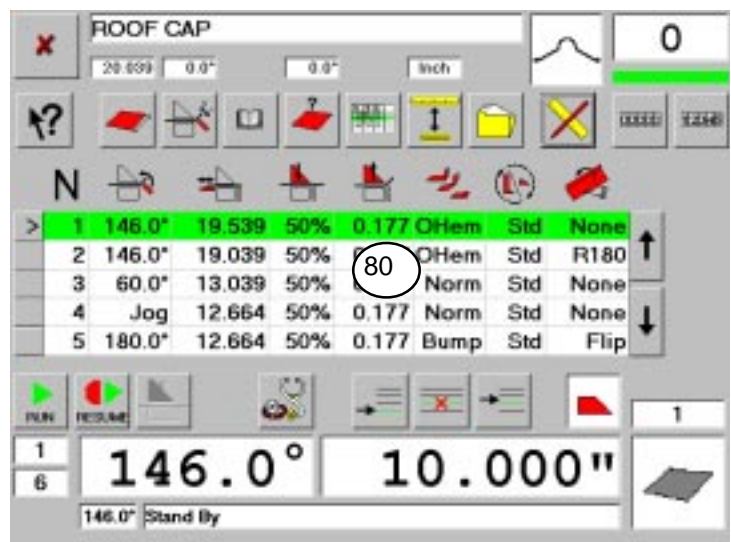
PRGSAM09

79. At each step, touch the box under the Tooling Symbol to bring up the Tooling Selection Pop-Up Display, and, if necessary, select the proper tooling for the operation.

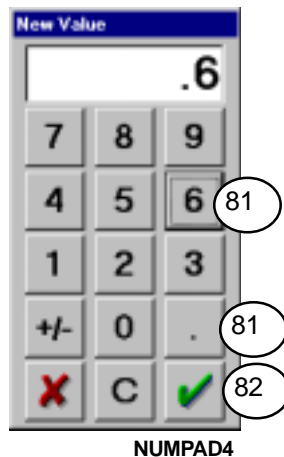


TOOLSEL

80. The clamping jaws must open wider to accommodate the hem on the edge of the material. Touch the box in the open height column in Operation 1. This will highlight the operation, and will bring up the Numerical Keypad.

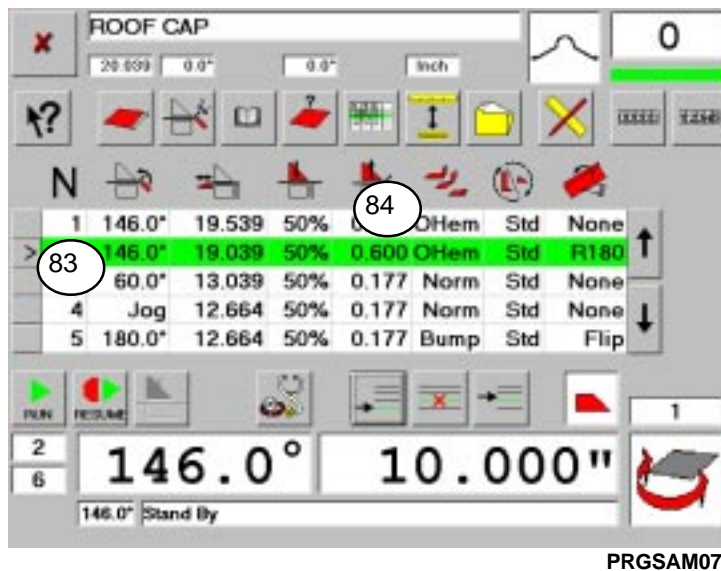


PRGSAM09



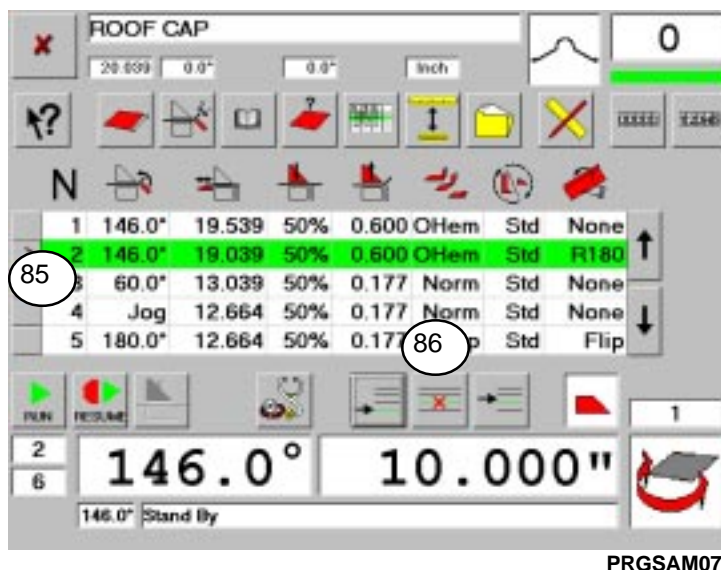
81. Using the Numerical keypad, enter the value .6.

82. Transfer the value to the program data by touching the Enter Touchbutton.



83. The clamping jaws must also open wider to accomodate the hem on the opposite edge of the material. Touch the box in the open height column in Operation 2. This will highlight the operation, and will bring up the Numerical Keypad.

84. Using the Numerical keypad, enter the value .6. Transfer the value to the program data by touching the Enter Touchbutton on the Numerical keypad.



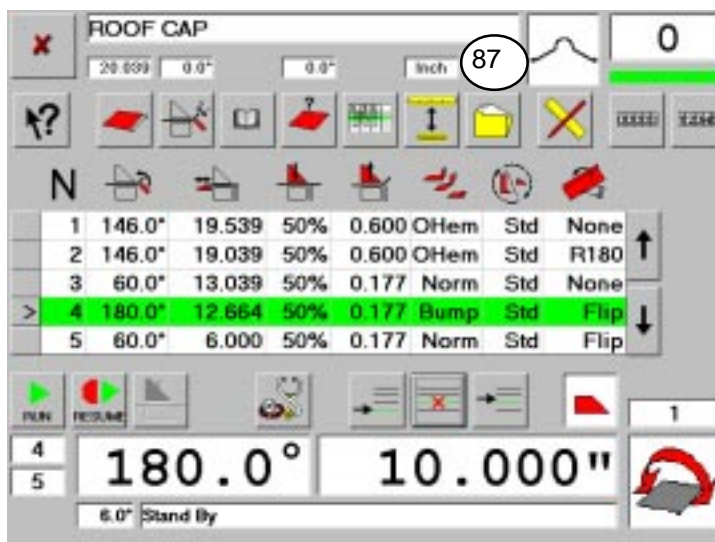
NOTE:

The jog operational line sets the backgauge but requires no bend. It must be removed from the program.

85. Touch the line indicator for Operational Step 4.

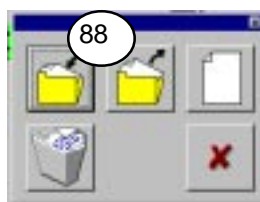
86. Touch the Delete Touchbutton to delete Operational Step 4.

87. The program is now ready for its final save. Touch the File Manager Touchbutton to bring up the File Manager Pop-Up Display



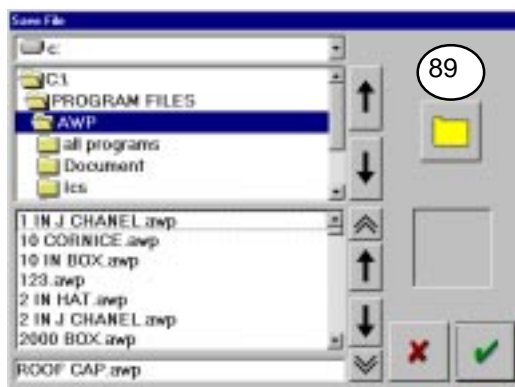
PRGSAM08

88. Touch the Save File Touchbutton. This will bring up the File Selection Display.

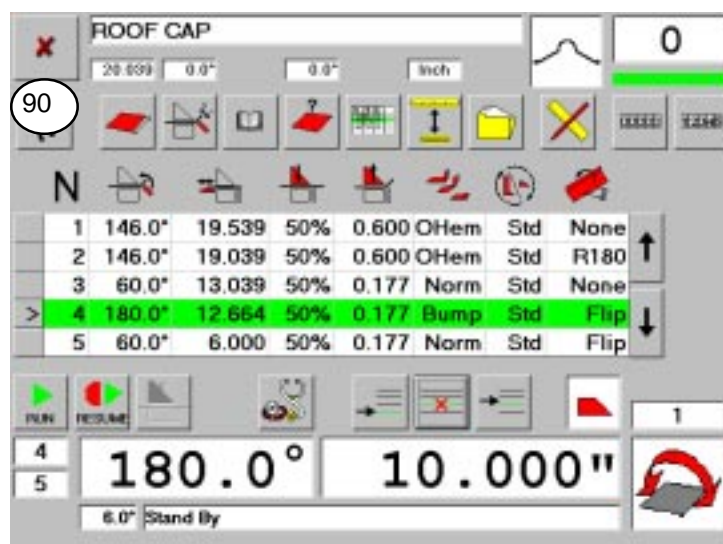


FILEMGR

89. Touch the Enter Touchbutton. This will add the **.awp** extension to the file name and save the file to the hard drive. The **.awp** extension indicates that the file is a finished program.

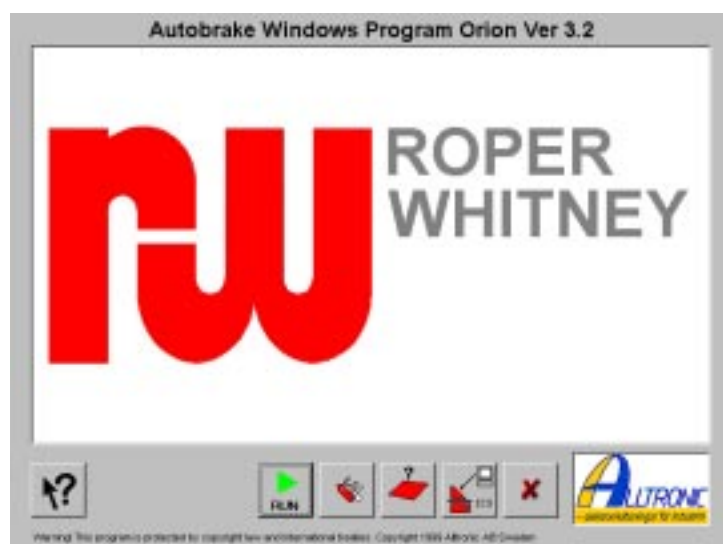


SAVFIL10



PRGSAM08

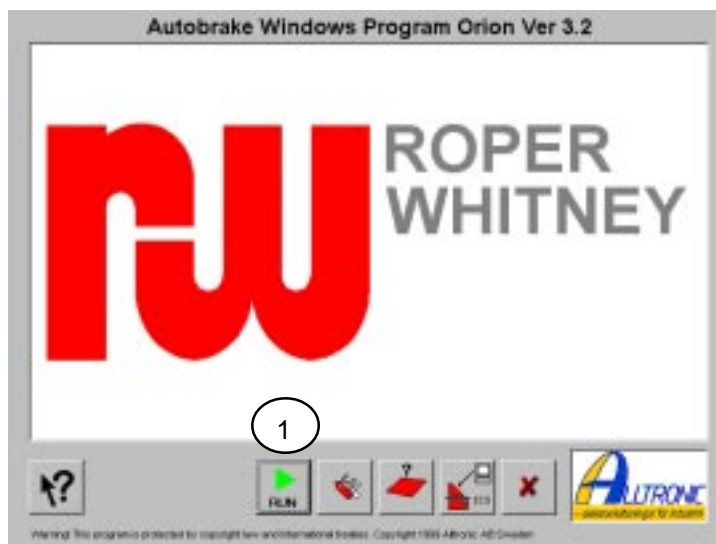
90. To return to the Main Screen, touch the Cancel Touchbutton.



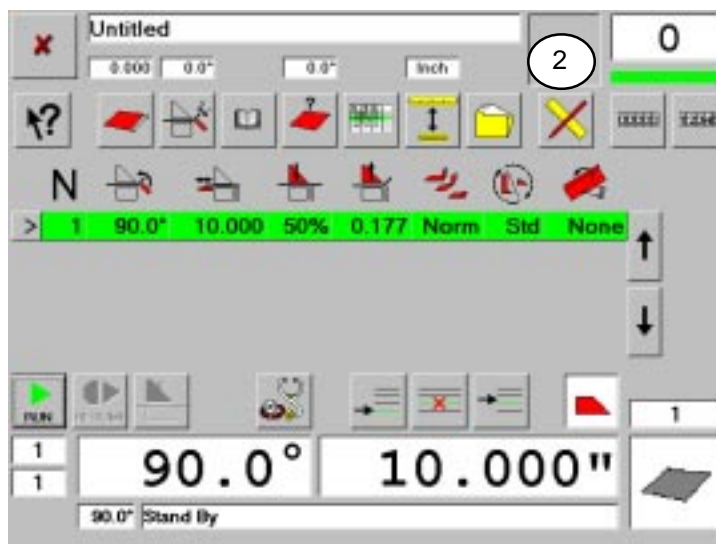
MAINSCR

At this point, the system is ready for additional programming, or for operation.

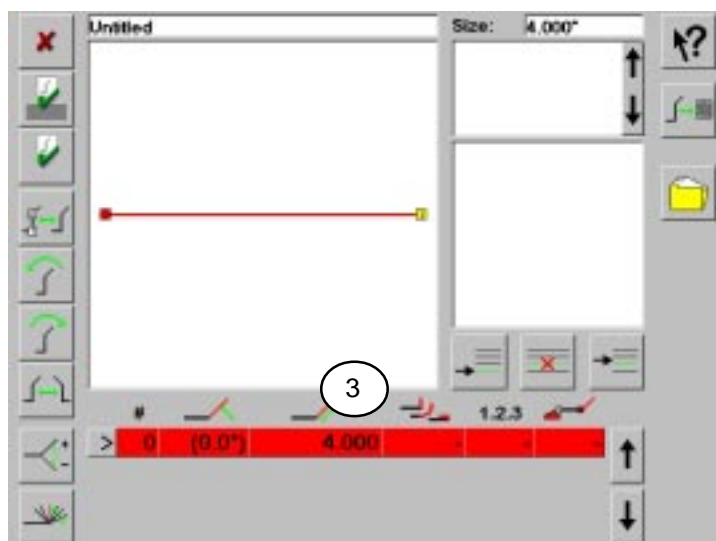
Intentionally blank.
Please continue.



MAINSCR



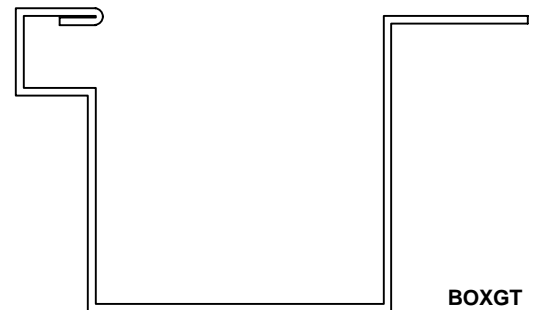
RUNPROG



GRPR001

GRAPHIC PROGRAMMING EXAMPLE

4.000-INCH BOX GUTTER



1. Touch the Run/Programming Touchbutton to bring up the Run/Programming Screen.

2. Touch the Graphic Programming Touchbutton to bring up the Graphic Programming Screen.

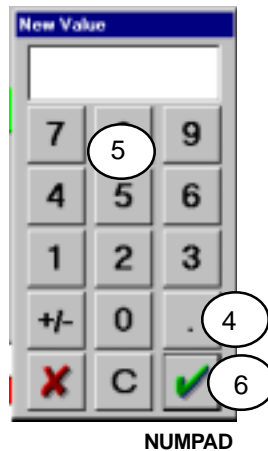
The default line length for the first line segment is not correct and must be modified.

3. Touch the value **4.000** to bring up the Numeric Keypad.

4. Touch the decimal point Touchbutton to enter a decimal point.

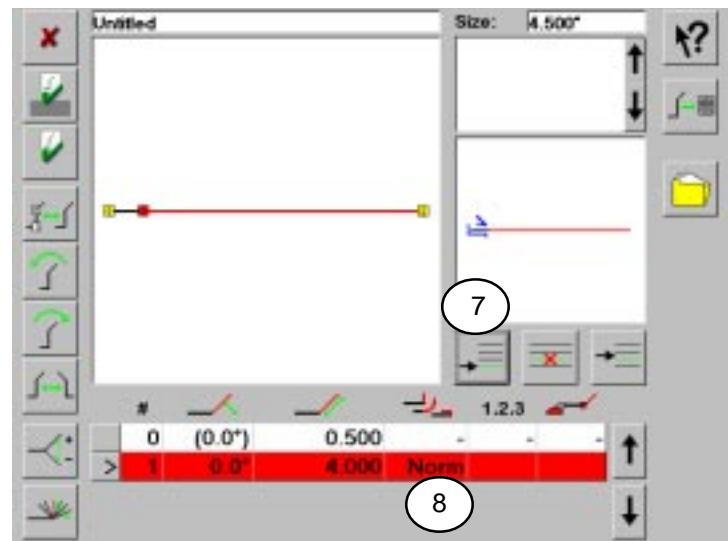
5. Touch the 5 Touchbutton to enter the desired line length (.5). Be sure the number appears in the box at the top of the display

6. Touch the Enter Touchbutton to move the value .5 to the segment length column of the Graphic Programming Screen.



7. Touch the Add Operation Touchbutton to create a second program line. The part is to have a hem along one edge.

8. Touch the hem Column in the second program line to bring up the hem Data Pop-Up Display.



GRPR002

9. Touch the Closed Hem Touchbutton to activate the hem Data Displays.



PRHEM01

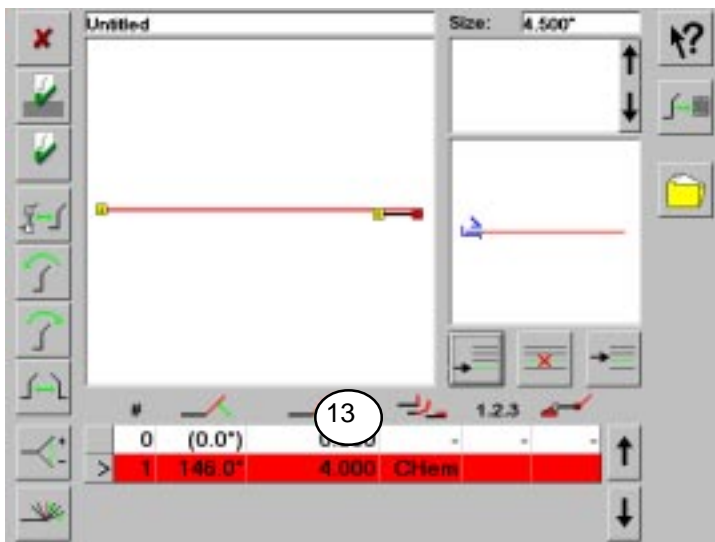
10. Using the Numeric Keypad, Enter **100** in the display box marked **PR** (this changes the maximum pressure used to 100 per cent).

11. Enter **0.118** in the display box marked **Move** (this sets the backgauge position).



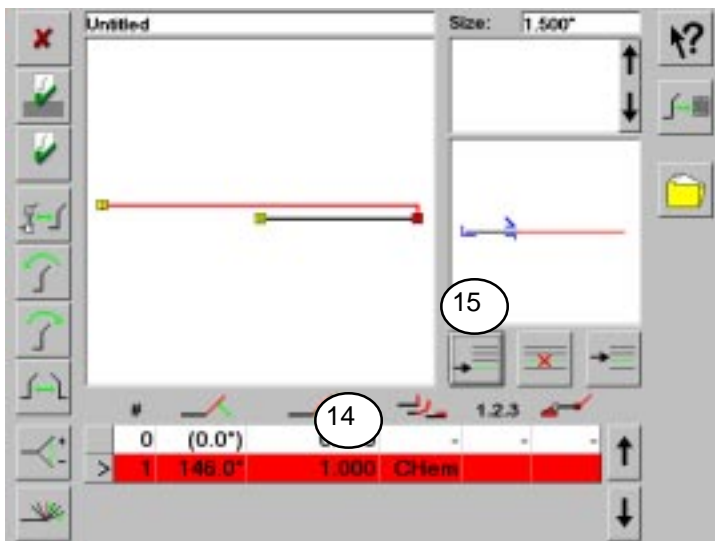
PRHEM02

12. Touch the Enter Touchbutton to enter the hem data into the program.



GRPR003

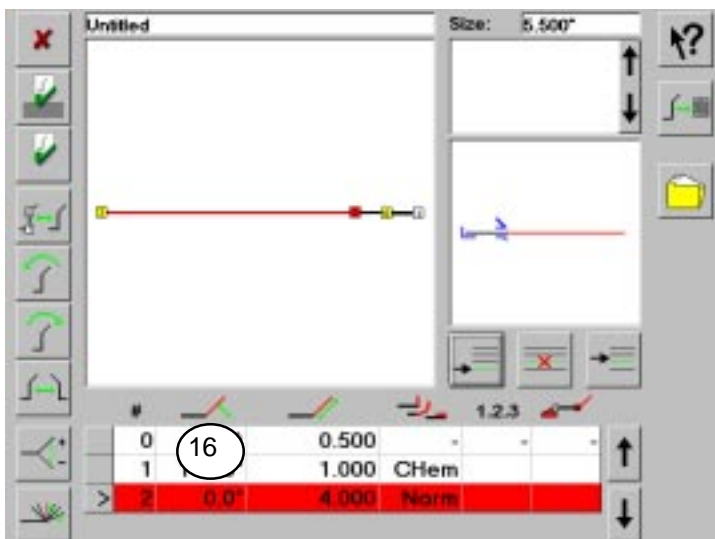
13. The line segment length must be changed. Touch the Line Length box in the hem operation line to bring up the Graphic Keypad.



GRPR004

14. Using the Graphic Keypad, enter **1.000** and transfer it to the Line Length Box in the Programming Screen.

15. Touch the Add Operation Touchbutton to add another operation to the Programming Screen. This will be the first bending operation after forming the hem.

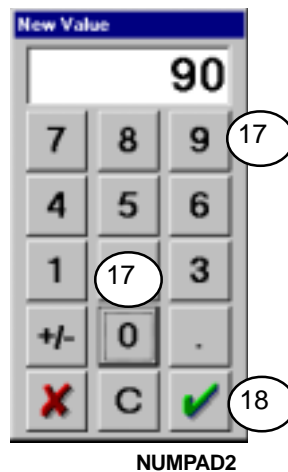


GRPR005

16. Touch the Bend Angle Box in the next operation line. This will bring up the Numeric Keypad again, this time to enter the bend angle.

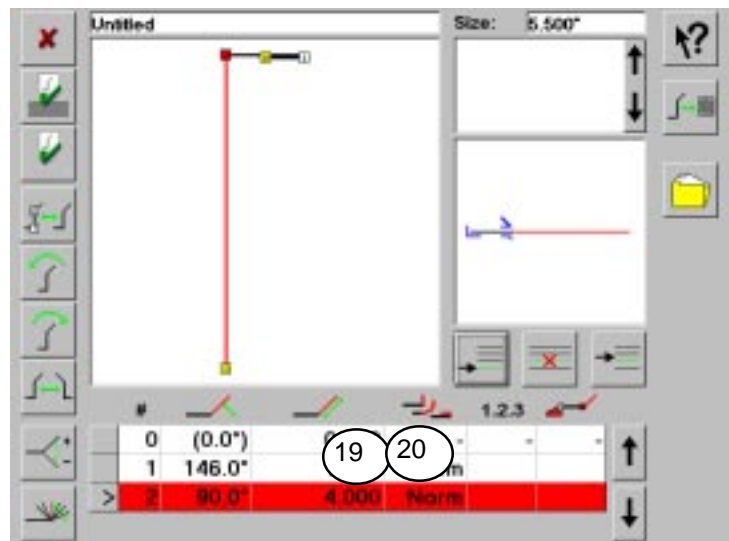
17. Enter **90** using the Numeric Keypad.

18. Transfer the value **90** to the Bend Angle Box in the Programming Screen by pressing the Enter Touchbutton.



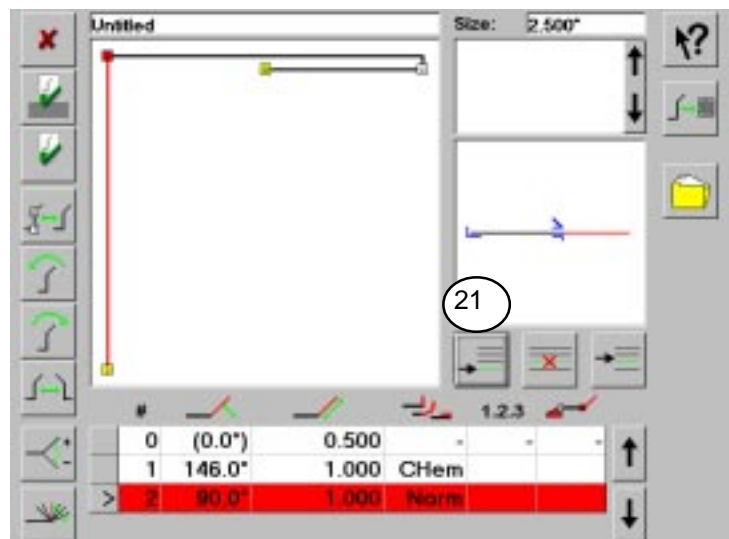
19. Touch the Line Length Box in the operation line to bring up the Graphic Keypad.

20. Enter **1.000** on the Graphic Keypad and transfer it to the Line Length Box by touching the Enter Touchpad.

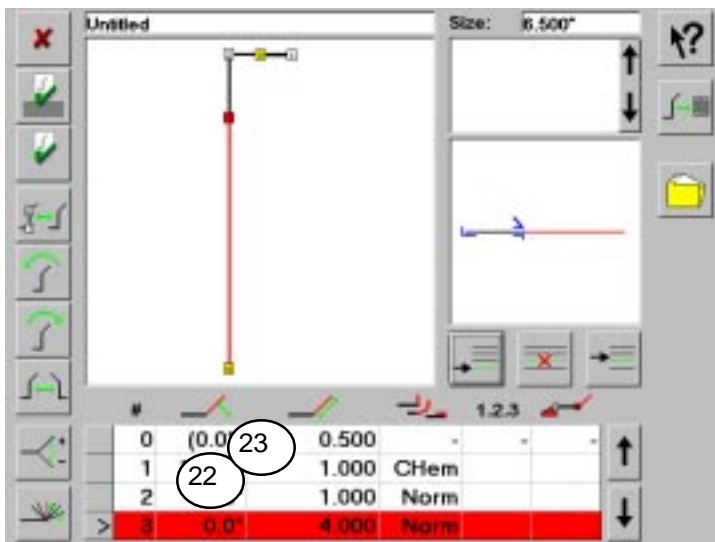


GRPR006

21. Touch the Add Operation Touchbutton to add another operation to the Programming Screen.



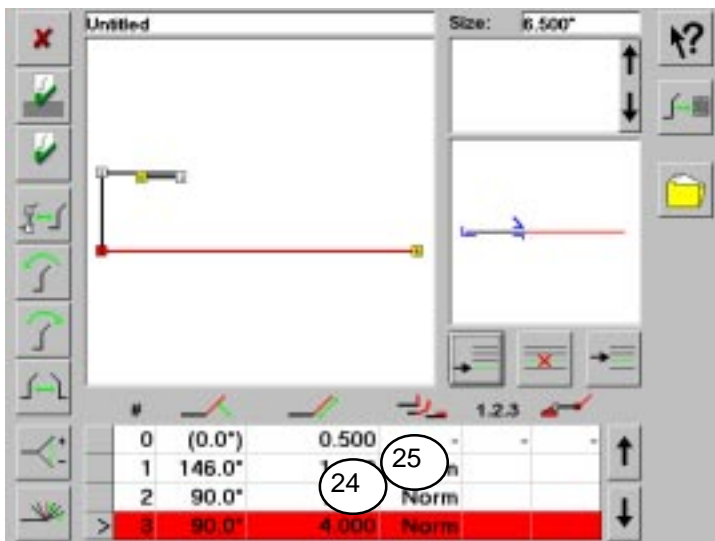
GRPR007



GRPR008

22. Touch the Bend Angle Box in the next operation line.

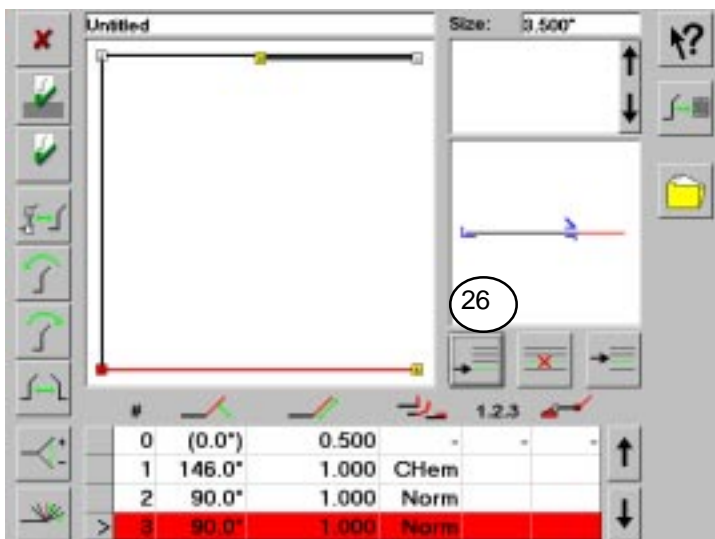
23. Using the Graphic Keypad, enter **90** in the Bend Angle Box .



GRPR009

24. Touch the Line Length Box in the next operation line.

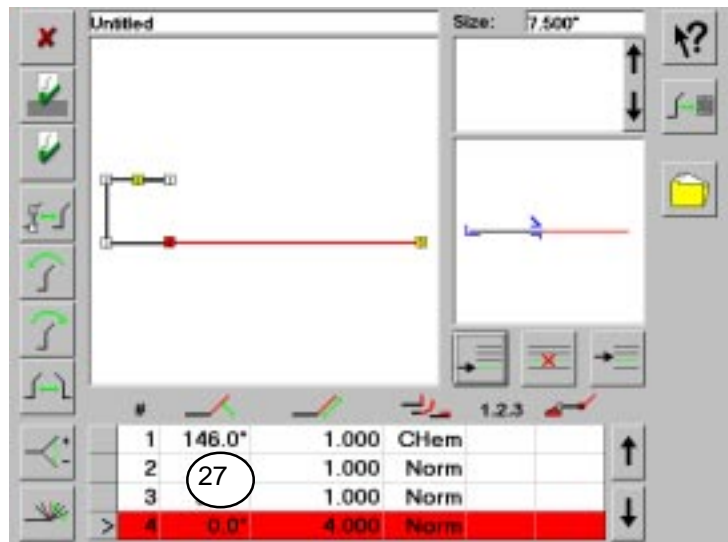
25. Using the Graphic Keypad, enter **1.000** in the Line Length Box .



GRPR010

26. Touch the Add Operation Touchbutton to add another operation to the Programming Screen. Note that the program line identified by "0" disappears from the screen.

27. Touch the Bend Angle Box in the next operation line. This will bring up the Numeric Keypad to enter the bend angle.

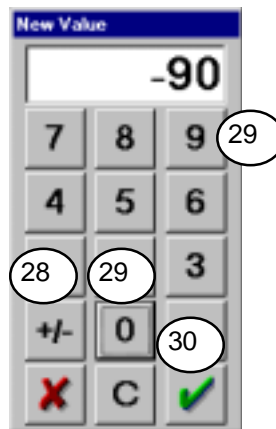


GRPR011

28. Touch the +/- Touchbutton to indicate that the bend has a negative (counterclockwise) value.

29. Enter **90** using the Numeric Keypad.

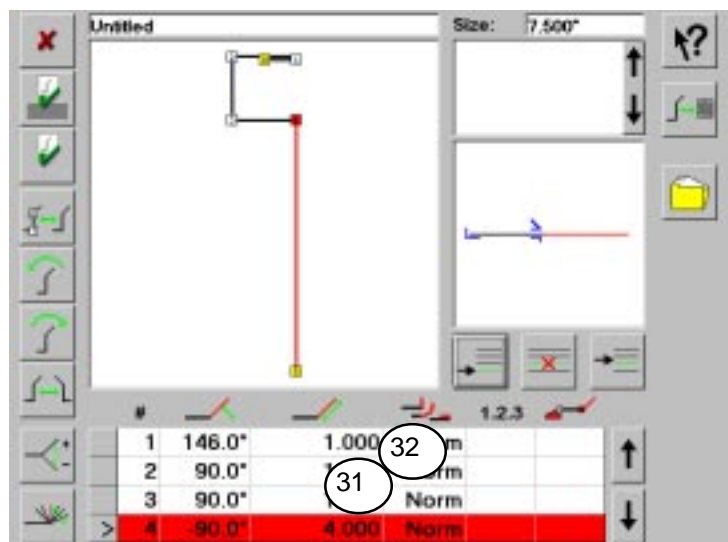
30. Transfer the value **-90** to the Bend Angle Box in the Programming Screen by pressing the Enter Touchbutton.



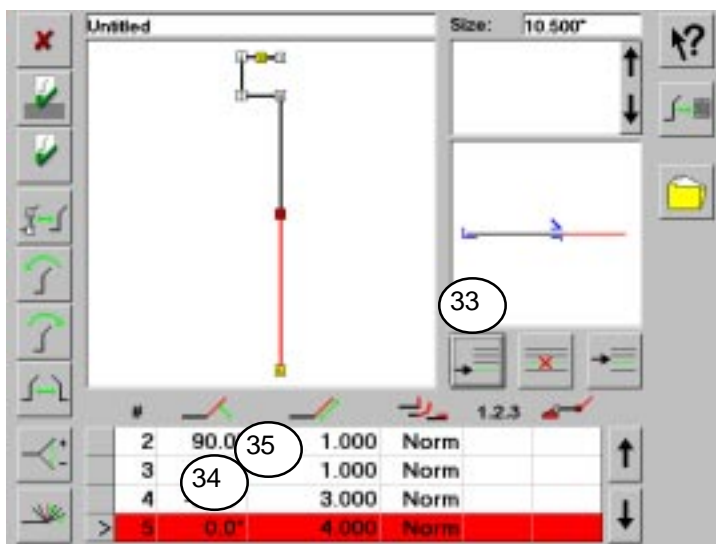
NUMPAD3

31. Touch the Line Length Box in the operation line to bring up the Graphic Keypad.

32. Enter **3.000** on the Graphic Keypad and transfer it to the Line Length Box by touching the Enter Touchpad.



GRPR013

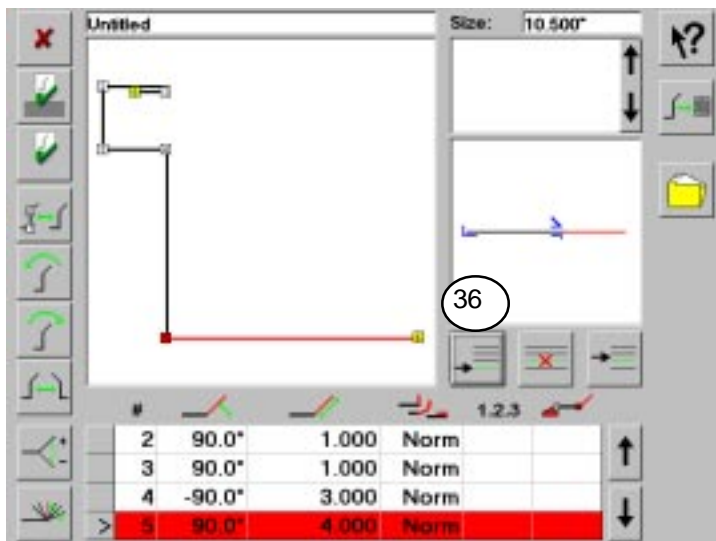


GRPR014

33. Touch the Add Operation Touchbutton to add another operation to the Programming Screen.

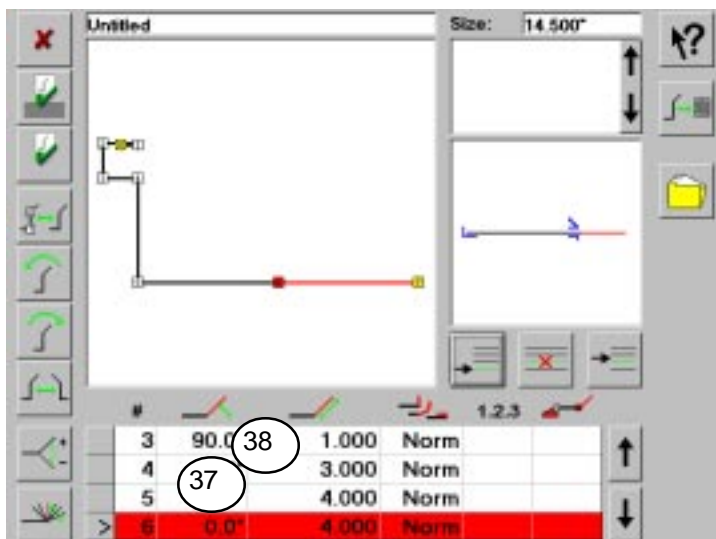
34. Touch the Bend Angle Box in the next operation line. This will bring up the Numeric Keypad to enter the bend angle.

35. Enter **90** using the Numeric Keypad. Transfer the value **90** to the Bend Angle Box in the Programming Screen by pressing the Enter Touchbutton.



GRPR015

36. The default value of 4.000 is acceptable as a line length. You may proceed to the next operation. Touch the Add Operation Touchbutton to add another operation to the Programming Screen.



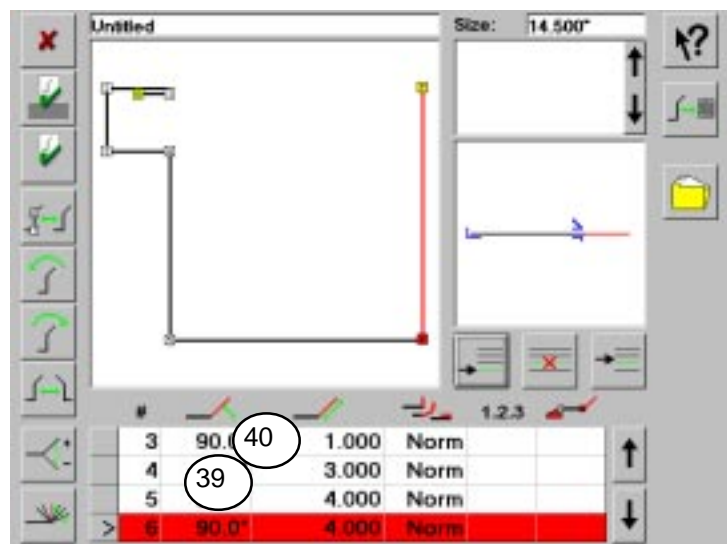
GRPR016

37. Touch the Bend Angle Box in the next operation line. This will bring up the Numeric Keypad to enter the bend angle.

38. Enter **90** using the Numeric Keypad. Transfer the value **90** to the Bend Angle Box in the Programming Screen by pressing the Enter Touchbutton.

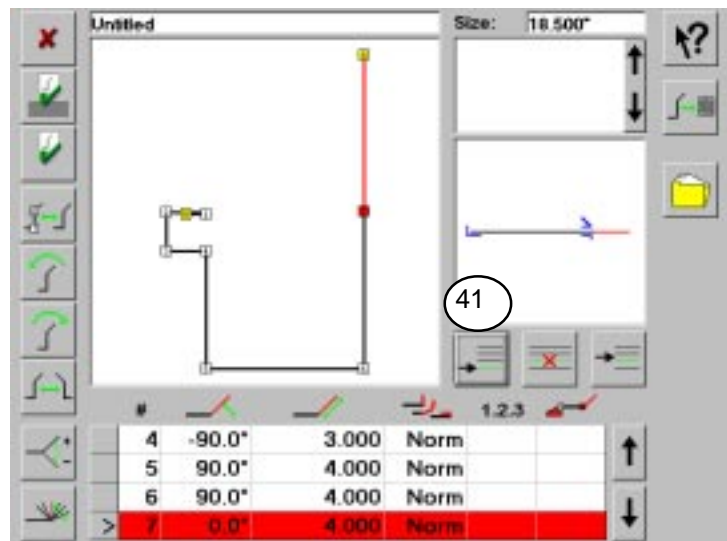
39. Touch the Bend Angle Box in the next operation line. This will bring up the Numeric Keypad to enter the bend angle.

40. Enter **90** using the Numeric Keypad. Transfer the value **90** to the Bend Angle Box in the Programming Screen by pressing the Enter Touchbutton.



GRPR017

41. The default value of 4.000 is acceptable as a line length. You may proceed to the next operation. Touch the Add Operation Touchbutton to add another operation to the Programming Screen.



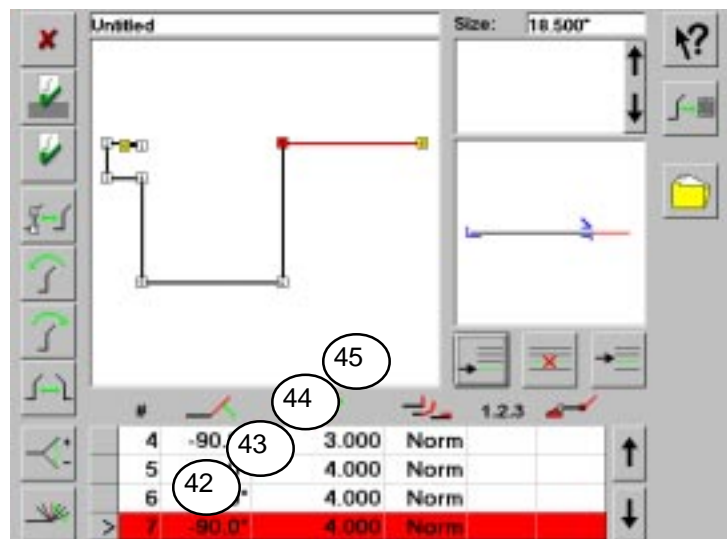
GRPR018

42. Touch the Bend Angle Box in the next operation line. This will bring up the Numeric Keypad to enter the bend angle.

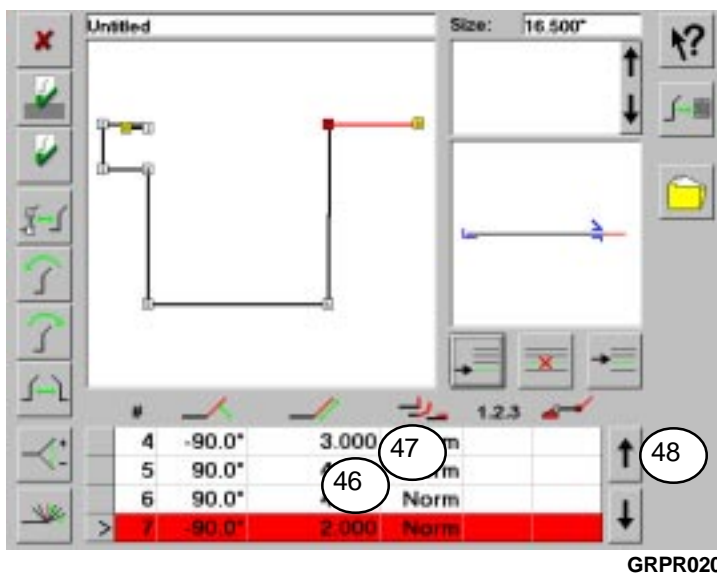
43. Touch the +/- Touchbutton to indicate that the bend has a negative (counterclockwise) value.

44. Enter **90** using the Numeric Keypad.

45. Transfer the value **-90** to the Bend Angle Box in the Programming Screen by pressing the Enter Touchbutton.



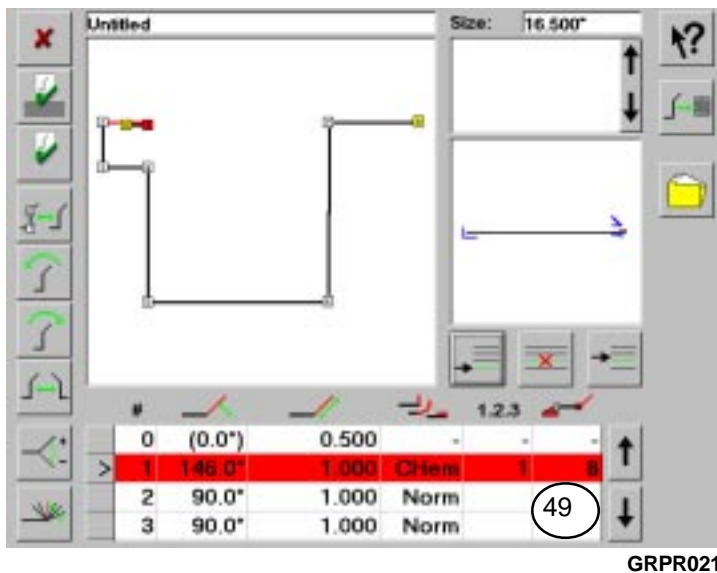
GRPR019



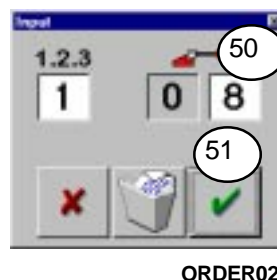
46. Touch the Line Length Box in the operation line to bring up the Graphic Keypad.

47. Enter **2.000** on the Graphic Keypad and transfer it to the Line Length Box by touching the Enter Touchpad.

48. Scroll upward through the operation lines to bring operation line 1 into view.



49. Touch the box in the Operation 1 line in the bend order column. The line representing Operation 1 will highlight in red, and the the Part Location Pop-Up Display will appear.



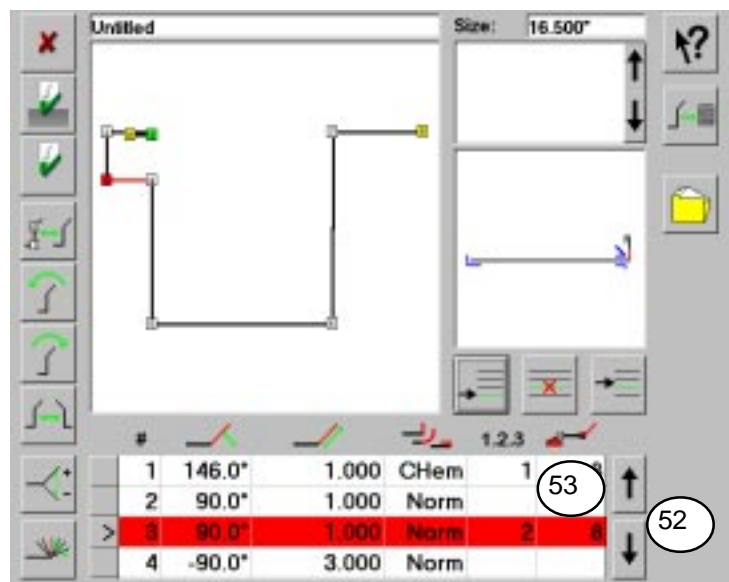
50. The Part Location Pop-Up Display shows that it will set the location for the part (against the back gauge) in Operation 1. It gives alternative location points for the operation of O or 8. Touch 8 to highlight it.

51. Accept that location by touching the Enter Touchbutton.

52. Scroll downward through the operation lines to bring operation line 3 into view.

NOTE:

The part profile was generated as a progression, moving from one segment to the next. This doesn't necessarily represent the bend order. The bend order is generated by identifying which line is the first operation, which is the second, etc.



GRPR022

53. Touch the box in the Operation 3 line under the part location symbol. The line representing Operation 3 will highlight in red, and the the Part Location Pop-Up Display will appear.

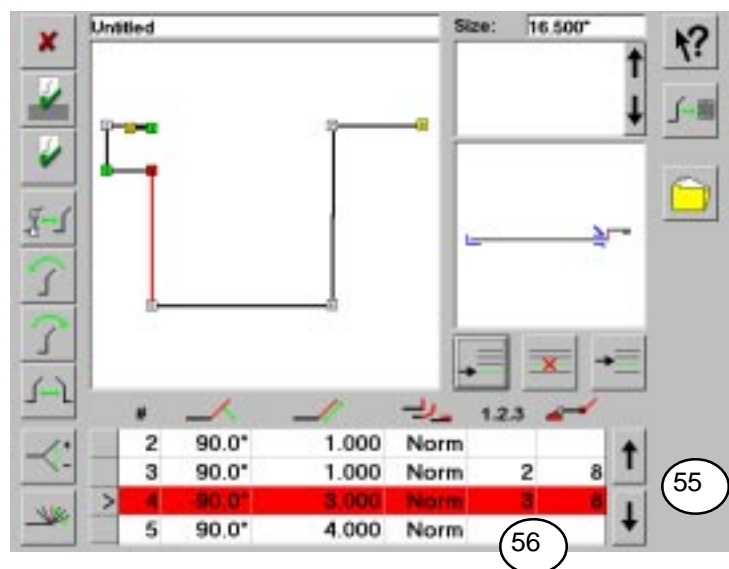
54. Location 8 is a suitable location point. Accept it by touching the Enter Touchbutton.



ORDER03

55. Scroll downward through the operation lines to bring Operation 3 into view.

56. Touch the box in the Operation 3 line under the part location symbol. The line representing Operation 4 will highlight in red, and the the Part Location Pop-Up Display will appear.

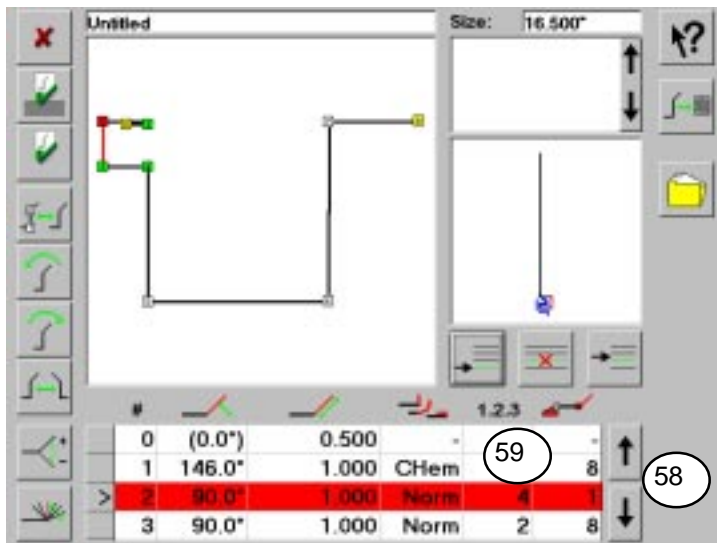


GRPR023

57. Location 8 is a suitable location point. Accept it by touching the Enter Touchbutton.



ORDER04



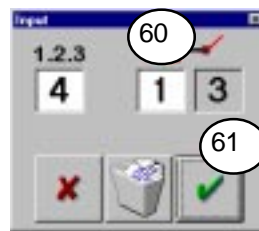
GRPR024

58. Scroll upward through the operation lines to bring Operation line 2 into view. (This will become bend 4.)

59. Touch the box in the Operation 3 line under the part location symbol. The line representing Operation 2 will highlight in red, and the the Part Location Pop-Up Display will appear.



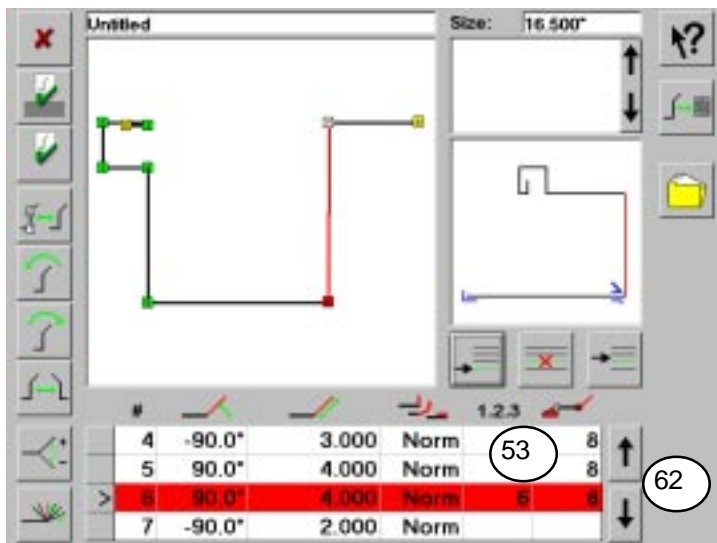
ORDER05



ORDER06

60. The Part Location Pop-Up Display shows that it will set the location for the part (against the back gauge) in Operation line 2. It gives alternative location points for the operation of 1 or 3. Touch 1 to highlight it.

61. Accept that location by touching the Enter Touchbutton.



GRPR025

62. Scroll downward through the operation lines to bring Operation line 5 into view.

NOTE:

Even though the operation sequence will not change for the last three operations, each must be checked to be sure that the location points are correct.

63. Touch the box in the Operation 5 line under the part location symbol. The line representing Operation 5 will highlight in red, and the the Part Location Pop-Up Display will appear.



ORDER07

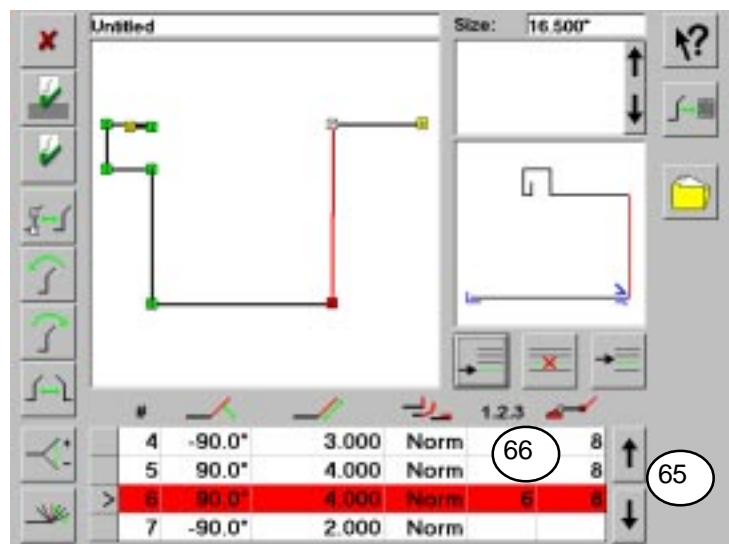


ORDER20

64. Location 4 is not a suitable location point (against the back gauge). Touch 9 8 to change the location. Accept it by touching the Enter Touchbutton.

65. Scroll downward through the operation lines to bring Operation 6 into view.

66. Touch the box in the Operation 6 line under the part location symbol. The line representing Operation 6 will highlight in red, and the the Part Location Pop-Up Display will appear.



GRPR028

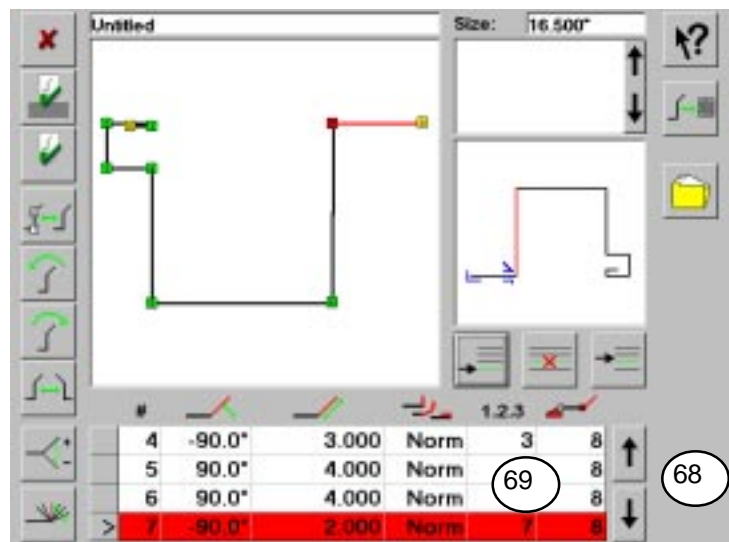
67. Location 8 is a suitable location point (against the back gauge). Accept it by touching the Enter Touchbutton.



ORDER08

68. Scroll downward through the operation lines to bring Operation 7 into view.

69. Touch the box in the Operation 7 line under the part location symbol. The line representing Operation 7 will highlight in red, and the the Part Location Pop-Up Display will appear.

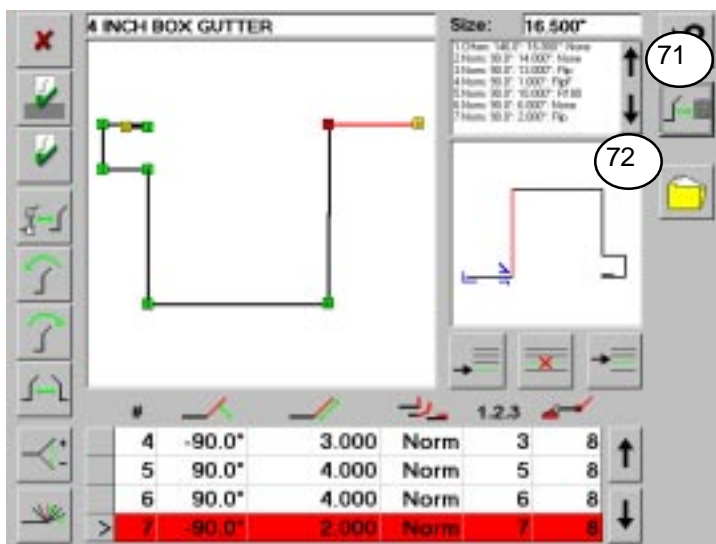


GRPR027

70. Location 8 is a suitable location point (against the back gauge). Accept it by touching the Enter Touchbutton.



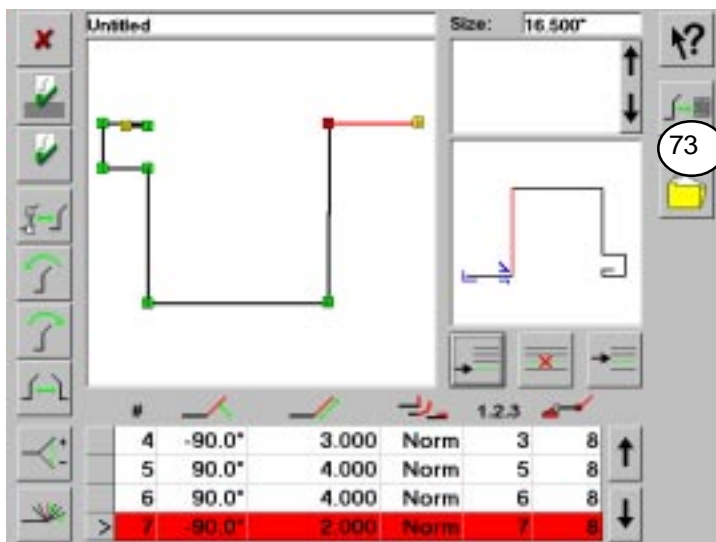
ORDER09



CKPRG

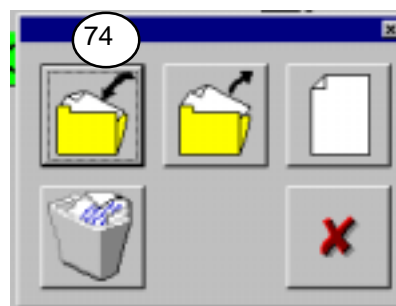
71. Prior to saving, preview the operation order. Touch the Preview Touchbutton. The program steps will appear in order in the program Preview Display.

72. Using the scroll Arrows, Scroll through the program steps to see that they are arranged as desired.



GRPR027

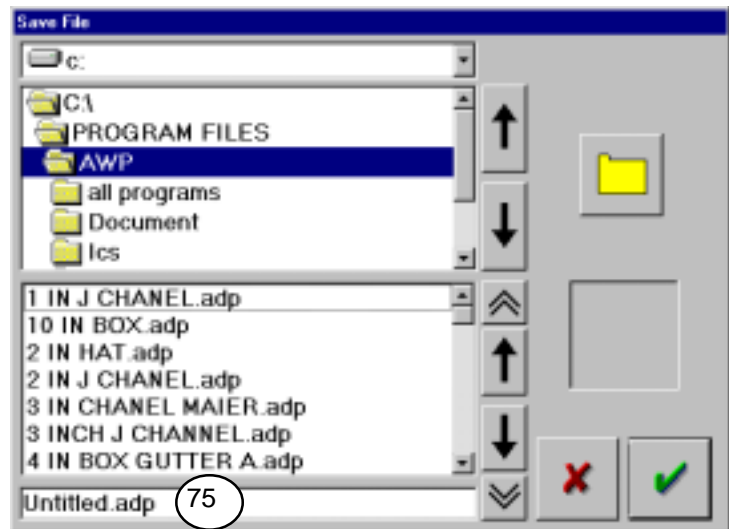
73. The drawing portion of the graphic programming file is now ready to be saved. Touch the File Manager touchbutton in the Graphic Programming Screen. This will bring up the File Manager Pop-Up Display.



FILEMGR

74. Touch the Save File Touchbutton in the File Manager Pop-Up Display. This will bring up the Program Selection Display.

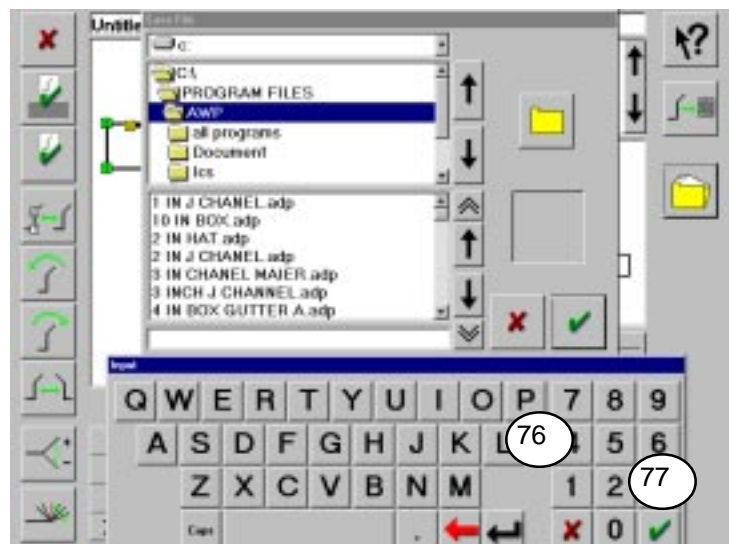
75. Touch the Program Title Display, which reads “Untitled.adp”. This will bring up the Alpha-Numeric Keypad.



SAVFIL01

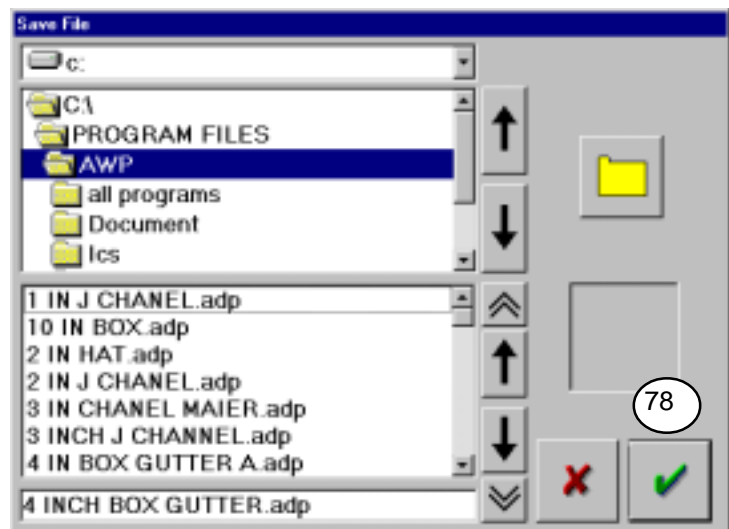
76. Enter a drawing name using the Alpha-Numeric Touchbuttons. As the characters are entered, they will appear in the Program Title Display.

77. When the name has been entered, touch the Enter Touchbutton. The Alpha-Numeric keypad will disappear, and the extension .adp will appear behind the name in the Program Title Display. This extension identifies the file as a drawing file.

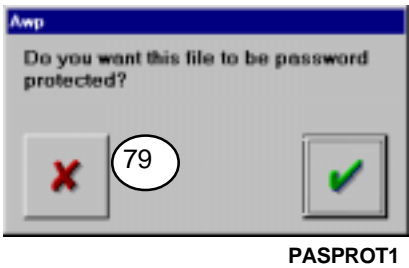


SAVFIL02

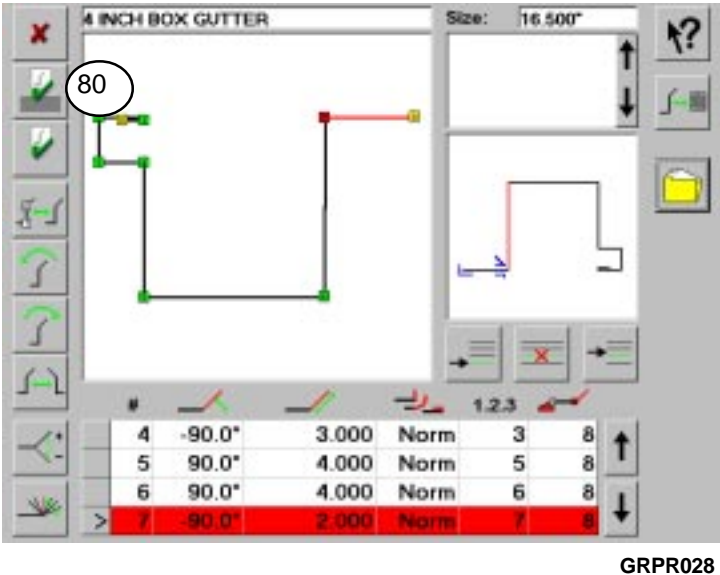
78. Touch the Enter Touchbutton in the Program Selection Display. At this point you **may** be asked if you wish to protect the file with a password.



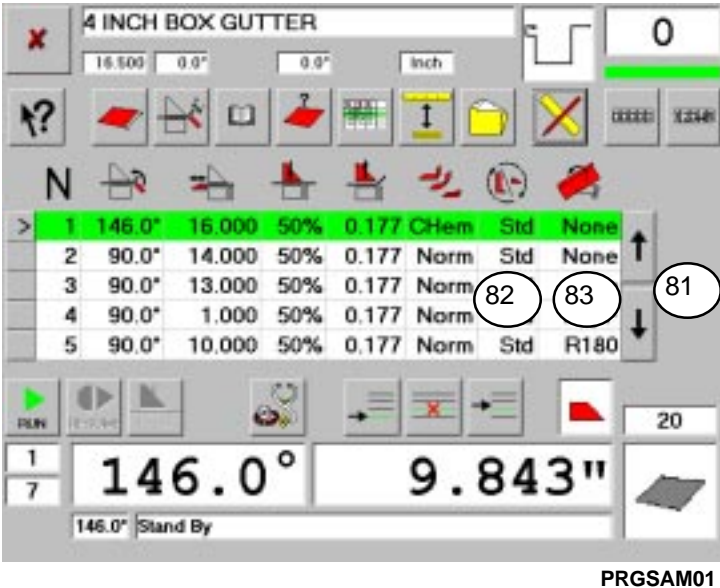
SAVFIL03



79. Normally files are not password protected. Touch the Cancel Touchbutton to proceed with programming without assigning a password.

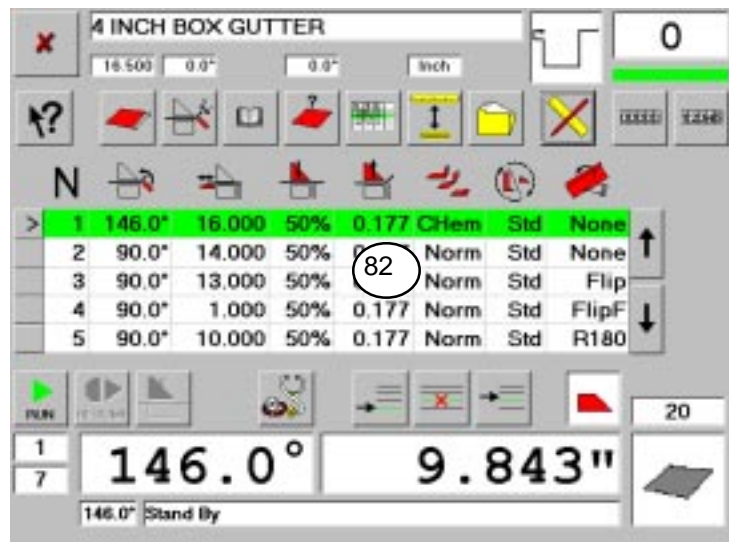


80. The program must now be completed by adjusting any other details generated by the automatic programming features of the graphic programming system. Touch the Create Program Touchbutton to bring up the Run/Programming screen.



81. Scroll through the program steps.

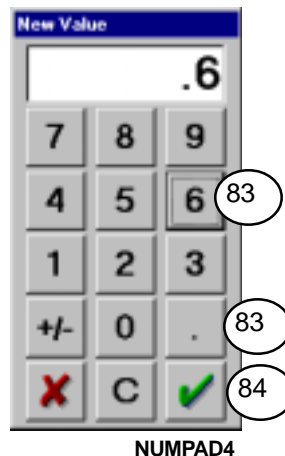
82. The clamping jaws must open wider to accommodate the hem on the edge of the material. Touch the box in the open height column in Operation 1. This will highlight the operation, and will bring up the Numerical Keypad.



PRGSAM01

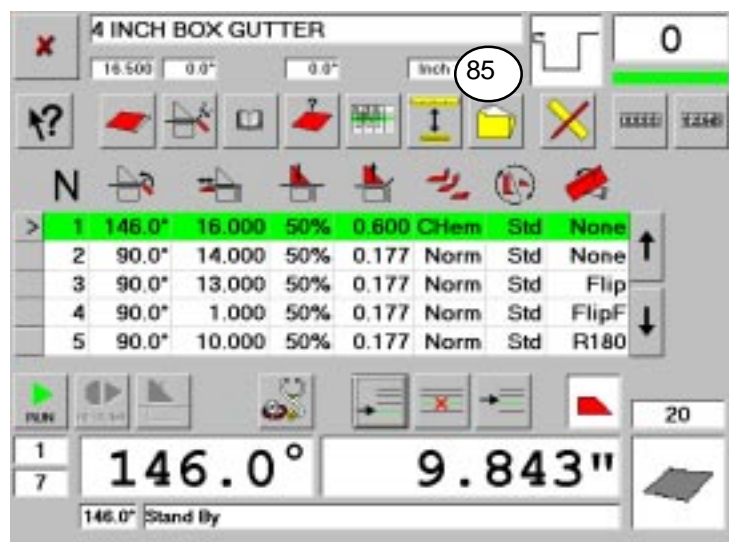
83. Using the Numerical keypad, enter the value .6.

84. Transfer the value to the program data by touching the Enter Touchbutton.

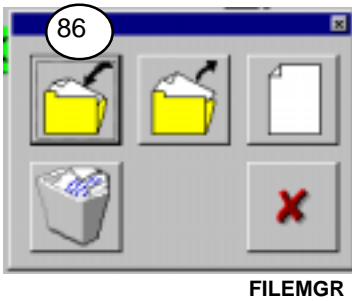


NUMPAD4

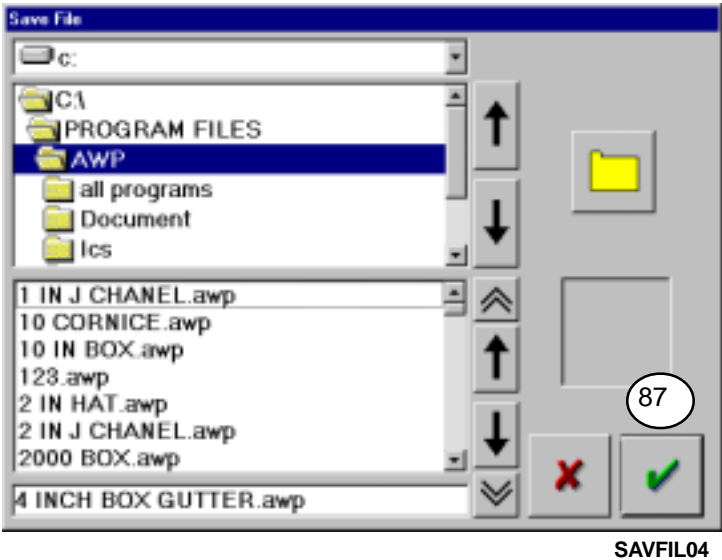
85. The program is now ready for its final save. Touch the File Manager Touchbutton to bring up the File Manager Pop-Up Display



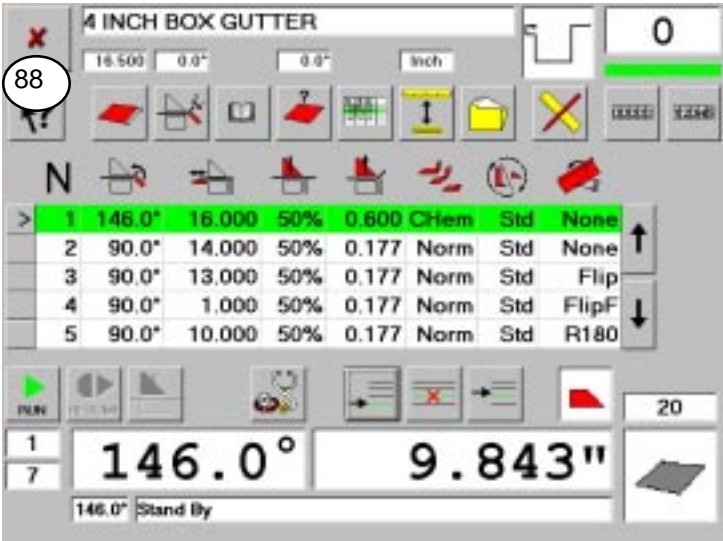
PRGSAM02



86.Touch the Save File Touchbutton. This will bring up the File Selection Display.



87. Touch the Enter Touchbutton. This will add the **.awp** extension to the file name and save the file to the hard drive. The **.awp** extension indicates that the file is a finished program.

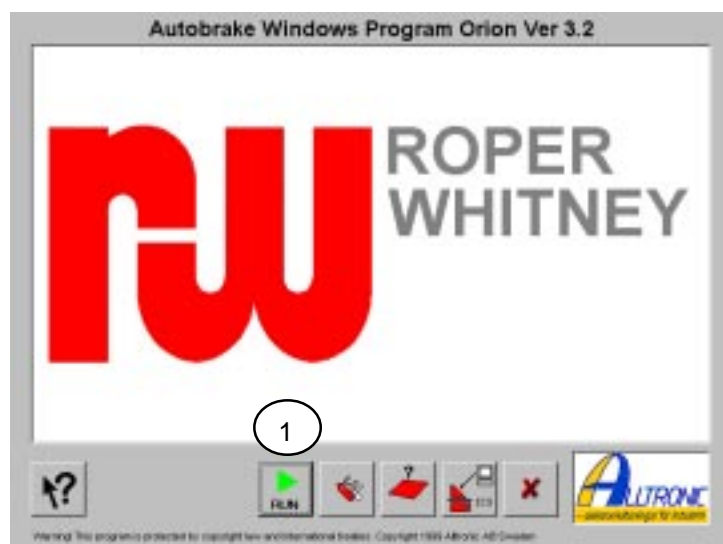


88.To return to the Main Screen, touch the Cancel Touchbutton.

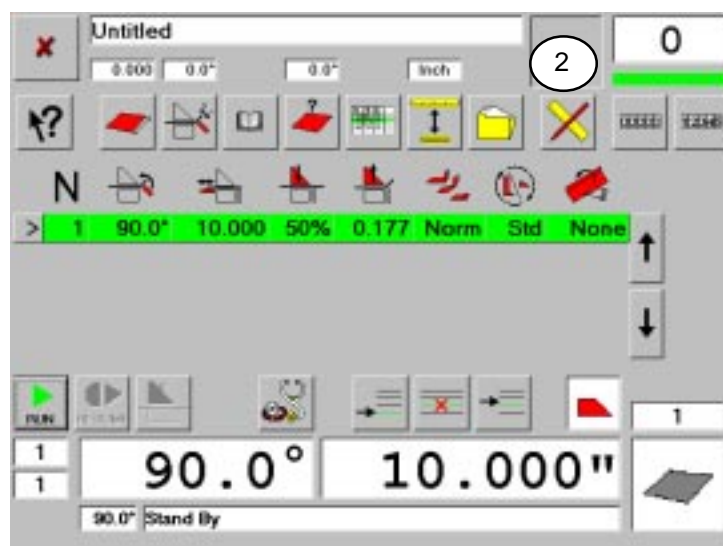
At this point, the system is ready for additional programming, or for operation.



MAINSCR



MAINSCR



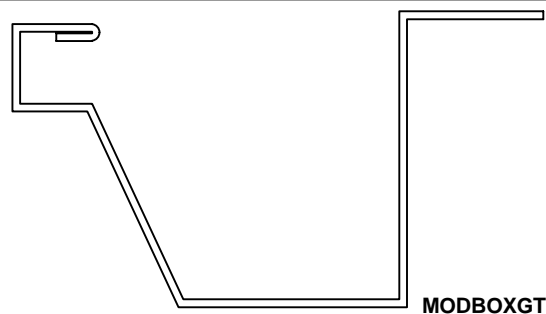
RUNPROG



GRPR001

GRAPHIC PROGRAMMING EXAMPLE

MODIFYING A GRAPHIC PROGRAM

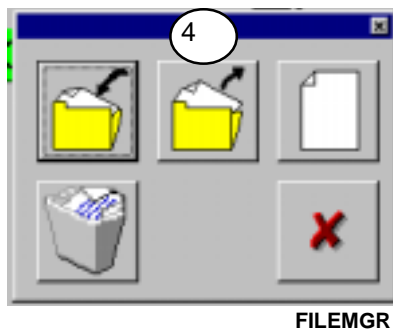


1. Touch the Run/Programming Touchbutton to bring up the Run/Programming Screen.

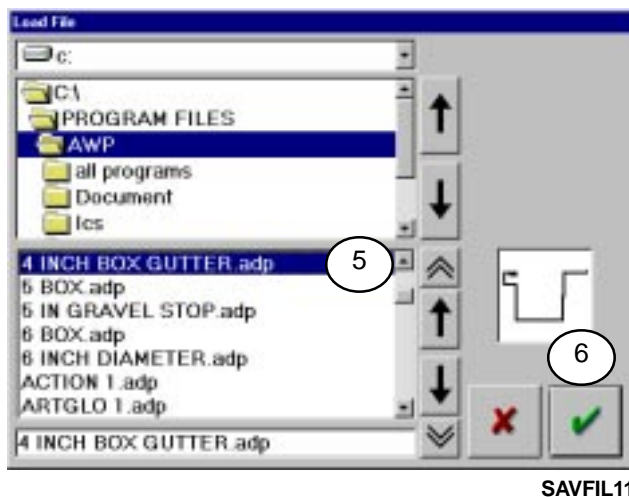
2. Touch the Graphic Programming Touchbutton to bring up the Graphic Programming Screen..

3. Touch the File Management Touchbutton to bring up the File Management PopUp Display.

4. Touch the Open File Touchbutton to bring up the Program Selection Display.

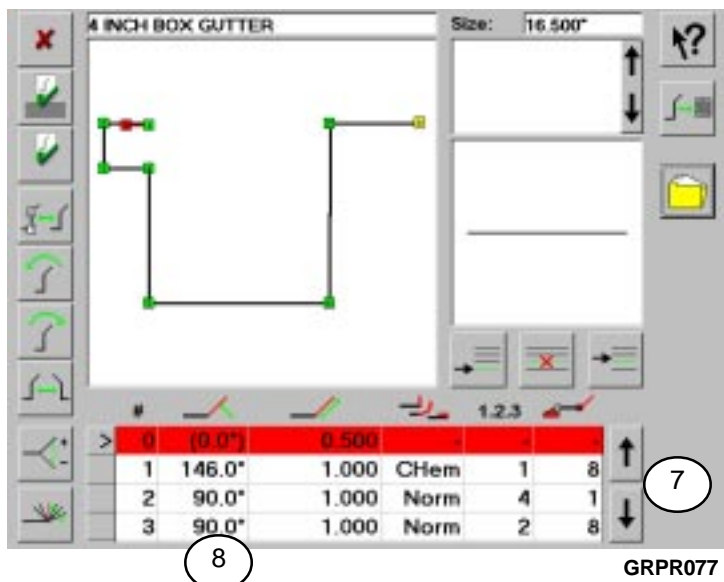


5. From the list of drawing files select **4 INCH BOX GUTTER.adp**.
6. Touch the Enter Touchbutton to bring up a graphic programming screen containing the drawing file selected.

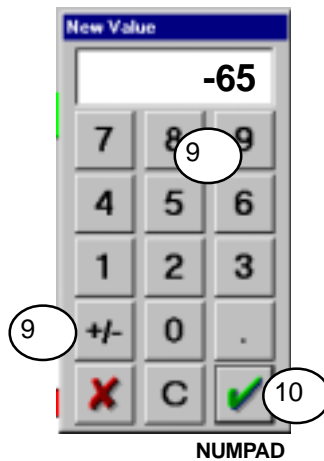


SAVFIL11

7. Scroll down the program lines to expose Operational Line 4.
8. Touch the Bend Angle Box in Line 4 to bring up the Numeric Keypad.

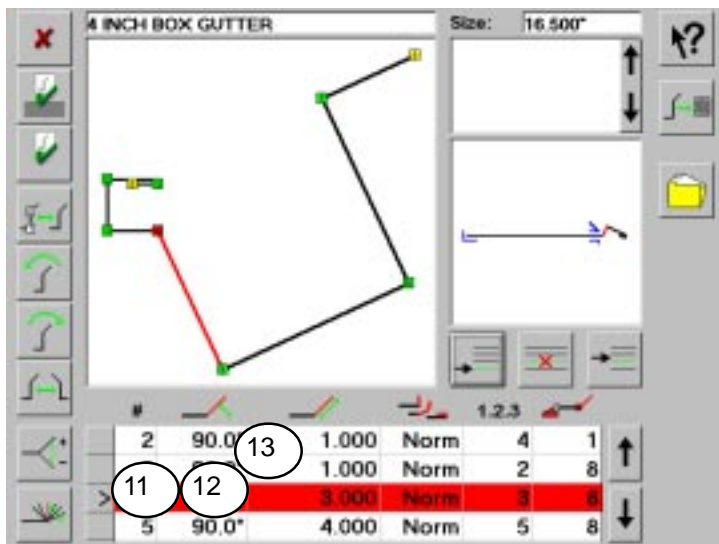


GRPR077



9. Enter **-65** using the Numeric Keypad.

10. Transfer the value **-65** to the Bend Angle Box in Operational Line 4 of the Programming Screen by pressing the Enter Touchbutton.

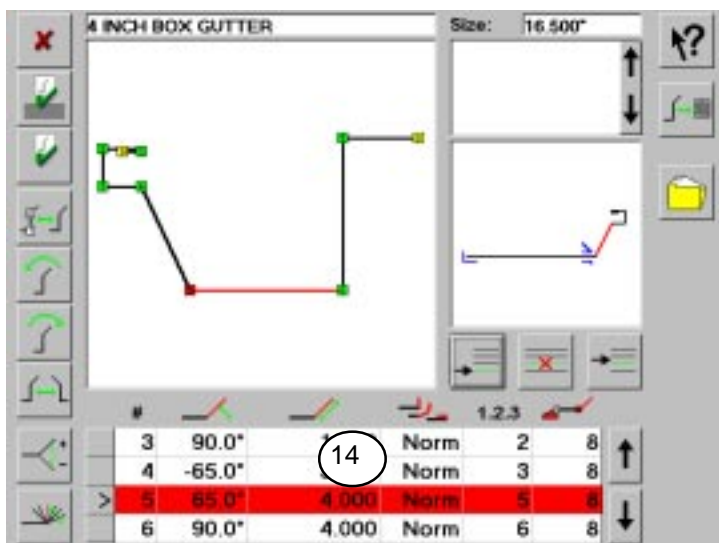


GRPR078

11. Touch the Operation Number box for Line 5.

12. Touch the Bend Angle Box in Line 5 to bring up the Numeric Keypad.

13. Using the Numeric Keypad, enter the bend angle value **65** in Operational Line 5 of the Programming Screen



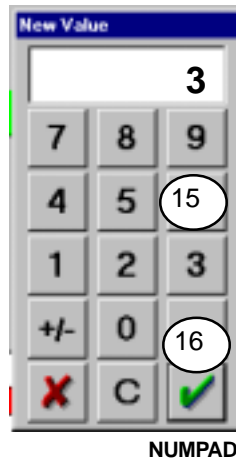
GRPR079

The length of the line segment defined by Operation line 5 must be modified.

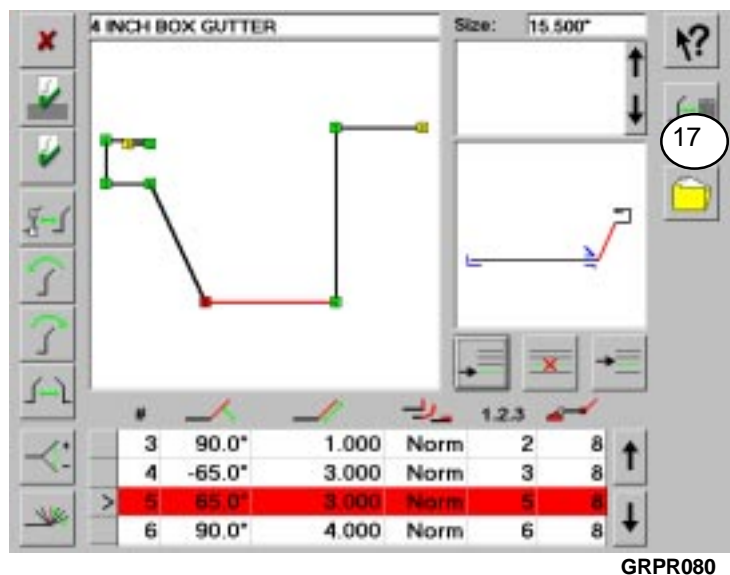
14. Touch the value **4.000** to bring up the Numeric Keypad.

15. Touch the 3 Touchbutton to entered the desired line length (3). Be sure the number appears in the box at the top of the display

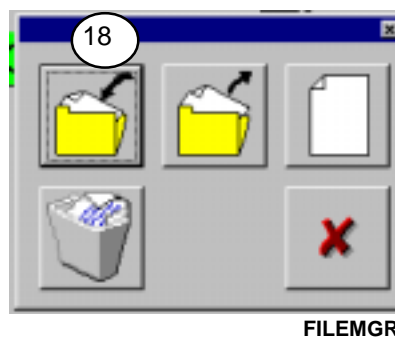
16. Touch the Enter Touchbutton to move the value 3 to the segment length column of the Graphic Programming Screen.

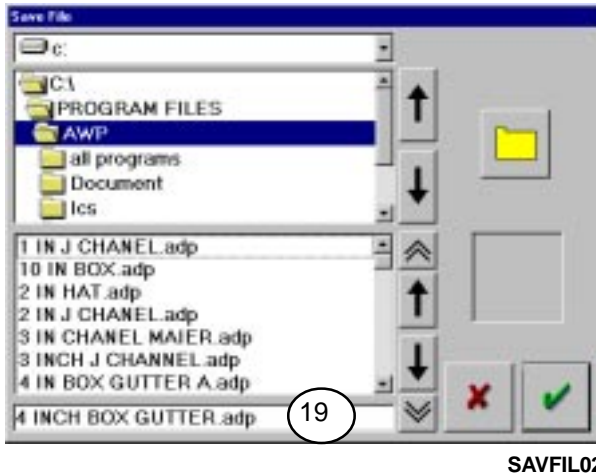


17. The modified drawing of the graphic program file is now ready to be saved. Touch the File Manager touchbutton in the Graphic Programming Screen. This will bring up the File Manager Pop-Up Display.

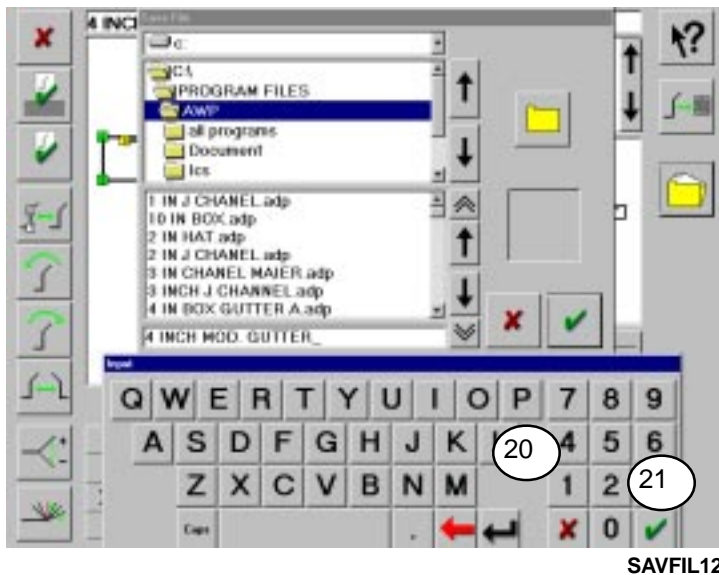


18. Touch the Save File Touchbutton in the File Manager Pop-Up Display. This will bring up the Program Selection Display.



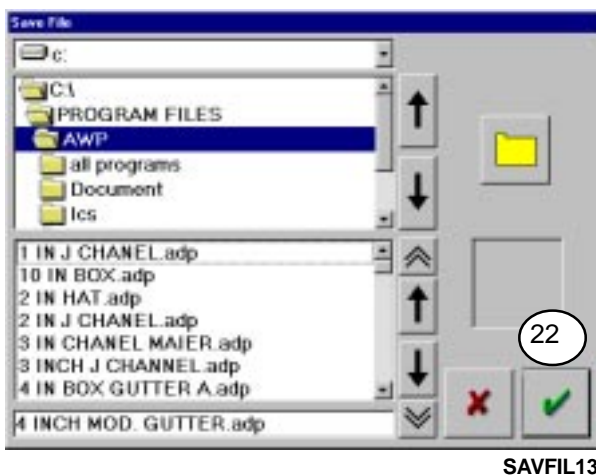


19.Touch the Program Title Display, which reads “**4 INCH BOX GUTTER.adp**”. This will bring up the Alpha-Numeric Keypad.



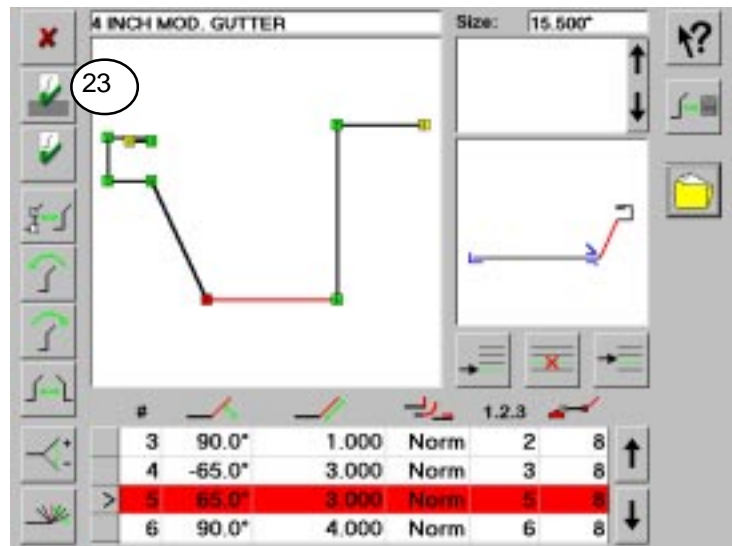
20. Enter the new drawing name “**4 INCH MOD GUTTER**” using the Alpha-Numeric Touchbuttons. As the characters are entered, the old title will disappear and the new one will appear in the Program Title Display.

21.When the name has been entered, touch the Enter Touchbutton. The Alpha-Numeric keypad will disappear, and the extension **.adp** will appear behind the name in the Program Title Display. This extension identifies the file as a drawing file.



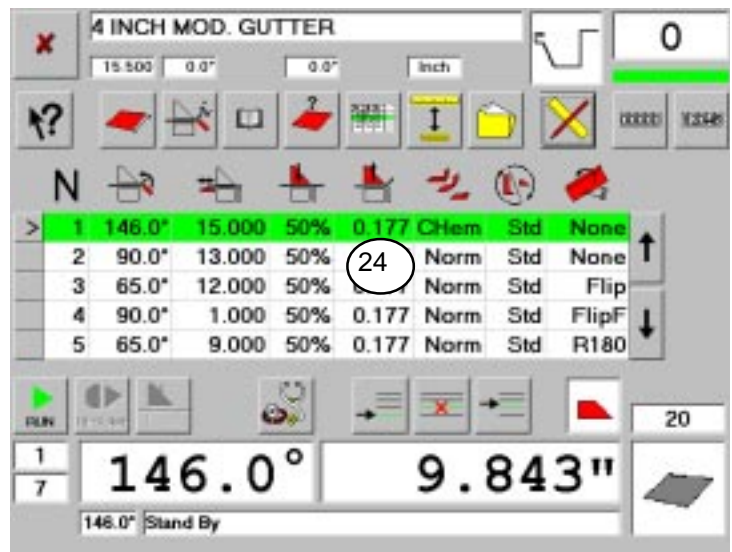
22.Touch the Enter Touchbutton in the Program Selection Display.

23. The program must now be completed by adjusting any program details in the original completed program. Touch the Create Program Touchbutton to bring up the Run/Programming screen.



GRPR081

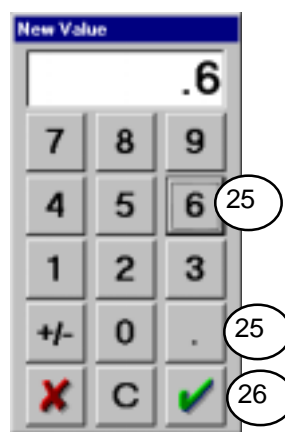
24. The clamping jaws must open wider to accommodate the hem formed on the edge of the material in Operation 1. Touch the box in the open height column in Operation 1. This will highlight the operation, and will bring up the Numerical Keypad.



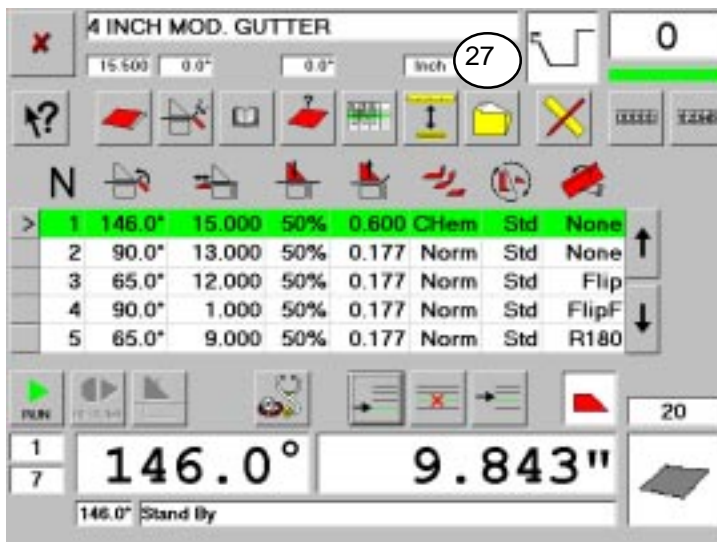
PRGSAM10

25. Using the Numerical keypad, enter the value .6.

26. Transfer the value to the program data by touching the Enter Touchbutton.



NUMPAD4



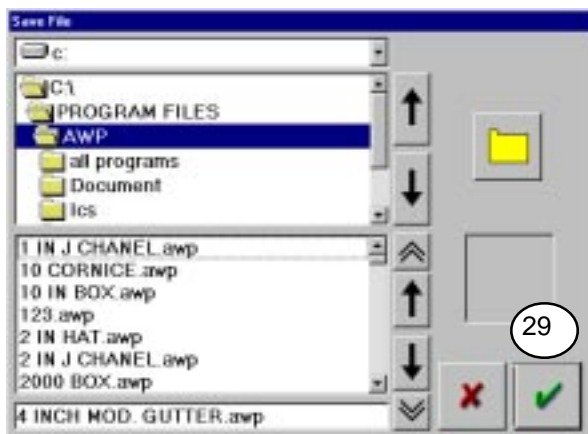
PRGSAM11

27. The program is now ready for its final save. Touch the File Manager Touchbutton to bring up the File Manager Pop-Up Display



FILEMGR

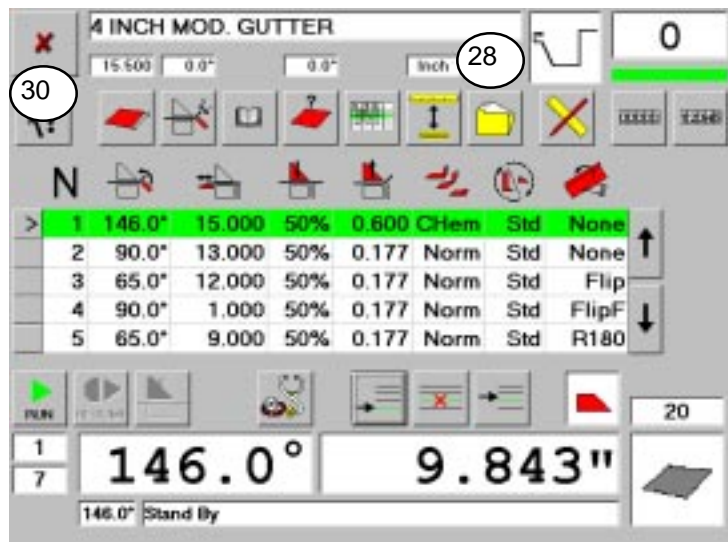
28. Touch the Save File Touchbutton. This will bring up the File Selection Display.



SAVFIL14

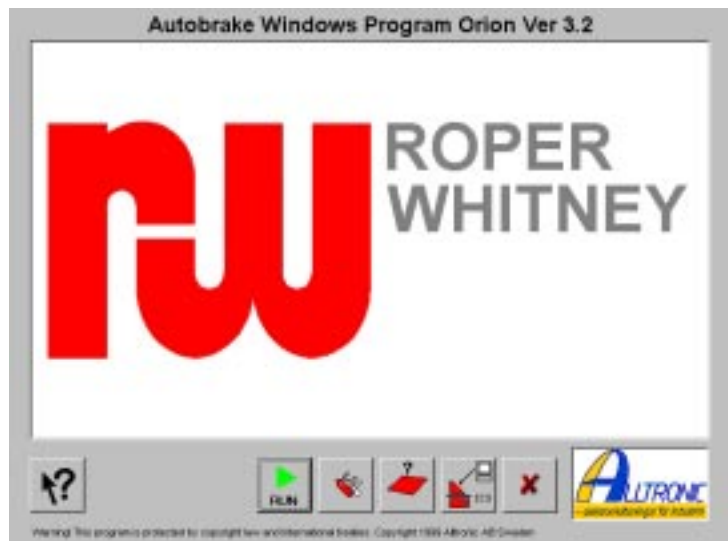
29. Touch the Enter Touchbutton. This will add the .awp extension to the file name and save the file to the hard drive. The .awp extension indicates that the file is a finished program.

30. To return to the Main Screen, touch the Cancel Touchbutton.



PRGSAM11

At this point, the system is ready for additional programming, or for operation.



MAINSR

ROPER WHITNEY
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