DA-40T series

The complete press brake control

Operation Manual V1, English

Delem

Everything under control

Preface

This manual describes the operation of the Delem control type DA-40T and is meant for operators who are instructed for operation of the total machine.

Limited warranty

- This manual does not entitle you to any rights. Delem reserves the right to change this manual without prior warning.
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1. Introduction

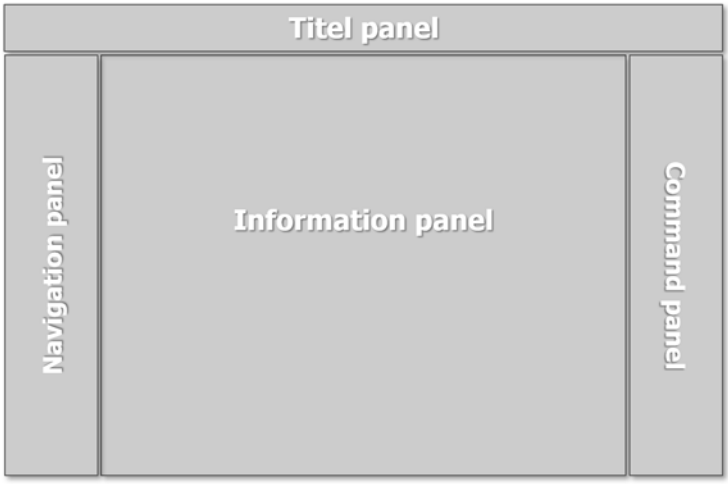
The DA-40T series is a programmable touch control for conventional torsion bar press brake machines.

Its user-friendly user interface is mainly based on icons, making it a fast and easy to program control. The high-quality widescreen TFT Color LCD display has a size of 7" and is equipped with an energy saving LED backlight.
The industrial grade glass panel with capacitive touch technology ensures a safe, reliable and accurate operation, even when wearing gloves in a sheet metal production environment.

2. Using the DA-40T

2.1 User interface layout

The user interface of the DA-40T is based on the proven Delem touch interface introduced in the Delem press brake controllers. In the picture below the main layout of the screen is explained. This layout is applicable for all the operating modes for the DA-40T, making the navigation easy and recognizable.



Navigation panel
- Direct access to all main functions
- Logically sorted to work step by step
- Recognizable in every mode

Title panel
- User level indication
- Product information
- Service row info
- Optional machine indicators

Information panel
- Large working area
- Context sensitive keyboard

Command panel
- Functions and soft keys belonging to the specific active function

In order to select a menu item or parameter simply tap the screen once at the position of the icon. If it is necessary to pan (for example in product select menu), keep your finger on screen and move in the desired direction. Pan is available to scroll in horizontal as well as vertical direction.

2.2 Available menus

The DA-40T has several modes for programming and operation:

Program selection
Select an existing program, or create a new program.

Automatic mode
Execute a program, or program step parameters.

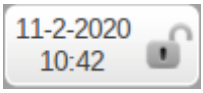
Manual mode
Execute a single program step.

Settings
Several control settings.

The several modes are explained in detail in chapters 3 to 6.

2.3 Key lock

The control is equipped with a key lock function, to prevent unauthorised programming.



It depends on the machine if this lock is accessible over the touch screen interface (upper left corner) or an external physical key switch.

To lock or unlock the controller, tap the key lock to open the on screen keyboard. Enter code 42 and press enter. You will see the status of the key lock is toggled from closed to open or from open to closed.

If the control is unlocked (key lock is open), it can be programmed as described in this manual. If locked (key lock closed), the following restrictions apply:
- programs cannot be created or edited
- programs cannot be deleted
- tools cannot be created or edited

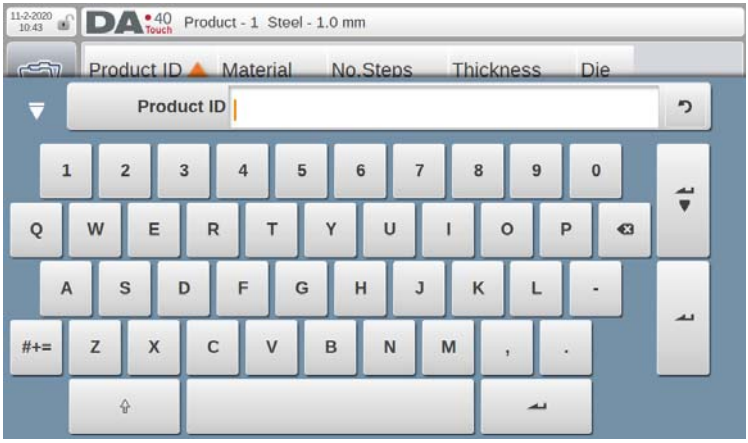
The following actions are still possible when the control is locked:
- programs can be selected (if they consist of one or more steps),
- programs can be executed,
- Y-axis corrections within programs can be changed,
- settings can be changed,
- axes can be moved in manual movement mode,
- in the manual mode it is still possible to program and execute one step.

There is a second code available for the key lock function. When code 21 is entered instead of code 42 the user interface is blocked. This can be used to block the machine from unauthorized use without switching the machine off. This special blocked stage can be recognized by an orange colored key lock symbol:

To release the controller for normal operation, tap the key lock symbol and enter code 21 followed by enter.

2.4 On screen keyboard

The DA-40T has a build in on screen keyboard as displayed below.



Besides the numerical and alphanumerical keys there are some additional keys:

Keyboard close
Close the on screen keyboard.

Caps lock
Switch between lower- and upper-case characters.

Special characters
Switch the keyboard between normal and special characters.

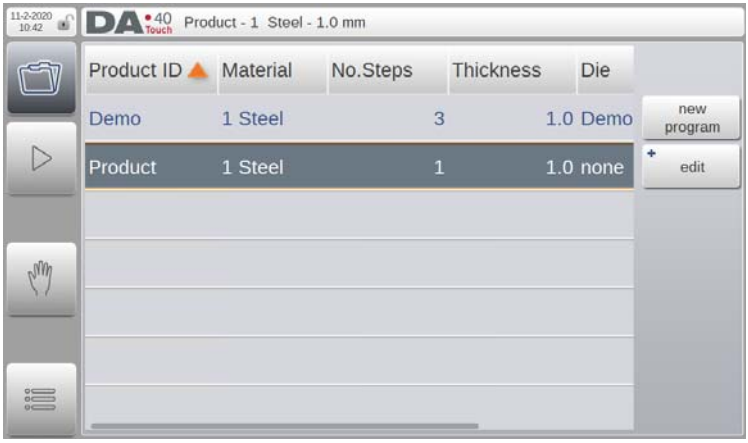
Enter key
This function confirms the entered value, keeps the cursor on the selected input field and afterwards automatically closed the keyboard. This is useful when entering a single value.

Enter-Next key
This function confirms the entered value, selects the next input field and keeps the keyboard open. This is useful when entering multiple values.

Special characters (like á, à, â, ã, ä, å, æ) are also supported. They appear when keeping a character (like 'a') pressed for about 2 seconds.

3. Program selection mode

By tapping the navigation button Program selection, the control is switched to program selection mode.



3.1 Select a program from memory

To select an existing program from the memory of the DA-40T, simply tap on the program to select it. When the program is successfully loaded the DA-40T will display an information message on the screen that the program is loaded. To execute this selected program, tap on the Automatic mode icon.

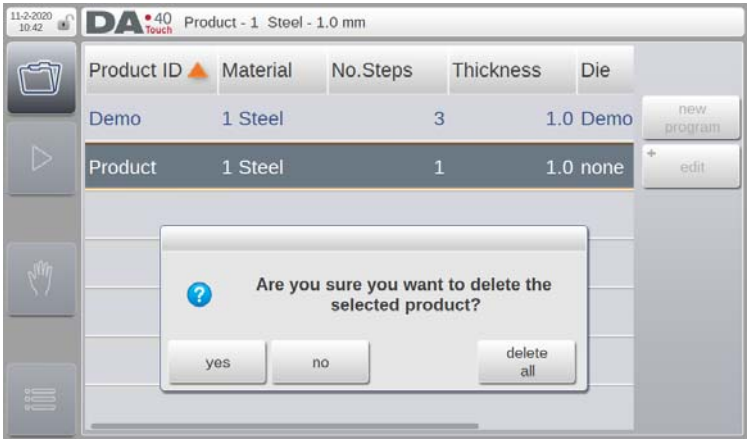
3.2 Copy/rename/delete a program from memory

Over the Edit function a selected program can be manipulated:

Copy
Create a copy of the selected program. When making a copy the DA-40T will prompt the keyboard for the user to provide a new name.

Rename
Change the name of the selected program. When renaming the DA-40T will prompt the keyboard for the user to provide a new name.

Delete
Remove the selected program from the memory. When deleting a program from memory the DA-40T will prompt a pop-up to confirm the Delete action. This to prevent an accidental delete action. This action is permanent!



Delete all
Remove all programs from the memory. When deleting all the stored programs the DA-40T will prompt a pop-up to confirm the Delete all action. This to prevent an accidental delete all action. This action is permanent!

3.3 Create a new program

To create a new program, select the new program soft key. The DA-40T will open the keyboard so the program name can be entered. If an already existing name is entered the DA-40T will prompt a message and asks if the existing program should be overwritten or not. In case the name was unique the DA-40T will switch automatically to the automatic mode screen. In automatic mode the several program steps can be defined. See for details chapter 4.

3.4 Column sorting and changing column positions

Column sorting and changing column width/position are available in program selection and automatic mode all steps screens.

Product ID ▲	Material	No.Steps	Thickness	Die
Demo	1 Steel	3	1.0	Demo

Column sorting
To Sort the data tap shortly in the middle of the column header. To change from ascending to descending tap shortly in the middle of the column header again. The column that is sorted is marked with an orange arrow (see the Product header above).

Changing column width
To change the width of a column, tap on the right end of the column header. A box around the column should appear to indicate that column width mode is active. While keeping the screen pressed move left or right to change the column width.

Changing column position
To change the position of a column, tap in the middle of the column header for 3 seconds. After 3 seconds the column color

will invert to indicate that column position mode is active. While keeping the screen pressed move left or right to change the column position.

4. Automatic mode

By tapping the navigation button Automatic mode, the control is switched to Automatic mode.

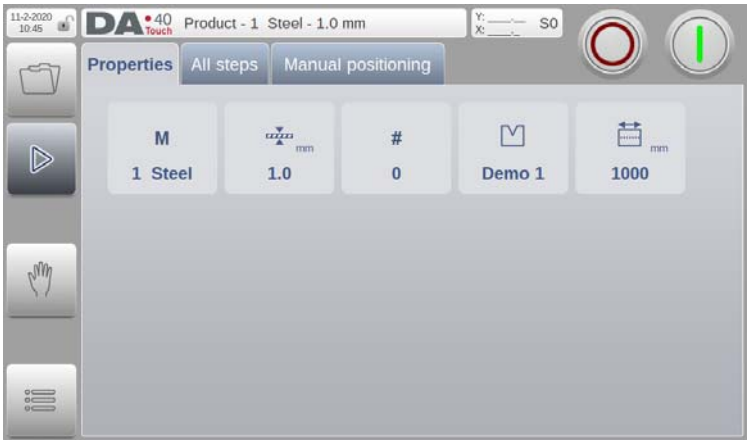
In Automatic mode a bending program can be defined or edited as explained in chapter 3.

This chapter describes all possible parameters that can be programmed for a program step. Note that most of these parameters are machine configuration dependent; it might be that some of the parameters shown are not present in the user interface.

Bend programs can only be programmed when tools and materials are available, so they must be programmed first. In order to execute the programmed product successfully the calibration point should be set correctly. Refer to paragraph 6.7.1 for setting the calibration point, and paragraph 6.2 for tool programming.

4.1 Properties

The ‘Properties’ tab defines the general parameters that apply for all program steps.



Material number

M

The material of the sheet. There are 6 material types available. Material properties can be programmed in Settings mode, as described in paragraph 6.3.

Thickness

The thickness of the sheet.

Product width

This value is used for bending force calculation.

Stock counter

#

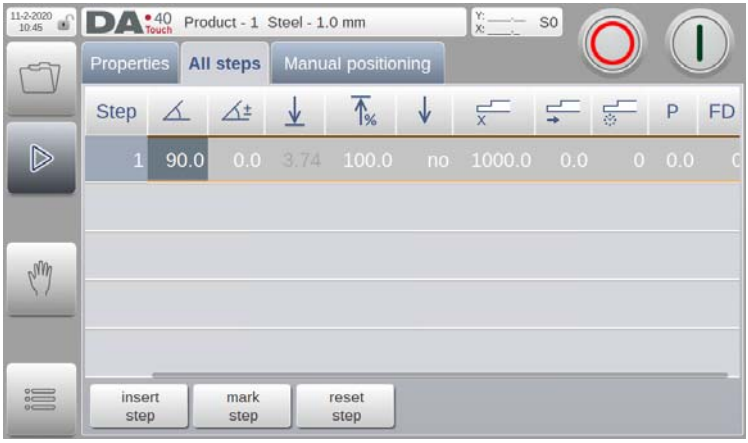
To count the number of products. If programmed to 0, the counter will increase after each finished product. If programmed higher than zero, the counter will count down. When it has reached 0, the control will stop. The stock counter will be reset to the initally programmed value when ‘start’ is pressed.

Die ID

The name (ID) of the selected die, which is used for this product.

4.2 All steps

In the ‘All steps’ tab the actual program step parameters are defined. A program consists of a minimum of 1 program step and a maximum of 25 program steps.



Start programming by entering values in the parameter fields. Some parameters are set automatically and can be changed if desired. If there are more parameters available than fits the screen, use the pan function to make the parameters visible. If desired, the order of parameters can be changed, see paragraph 3.4.

A single step can be inserted or deleted at any point in the program.

Insert step
Select the number of the step after which one a step should be inserted (To add a step select the last step in the program). Press the ‘insert step’ soft key; a copy of the selected step will be inserted. The cursor will automatically move to the new step.

Mark step
Select the number of the step that should be moved or swapped. Press the ‘mark step’ soft key. Then select the next program step and press the ‘move step’ soft key to move the marked step to the selected position, or press the ‘swap steps’ soft key to swap the marked step with the selected step

Delete step
Select the number of the step that should be deleted. Press the ‘delete step’ soft key; the selected step will be deleted. The succeeding steps are shifted up.

A complete program can be deleted in the program selection mode.

4.3 All steps parameters

Each line represents one step. The first column contains the step number. For each step, the following parameters can be programmed.

Angle
The desired angle value. This parameter is available when a tool is programmed.

Angle correction
When angle programming is used, this correction is used to correct Y-axis values. A positive correction means a lower beam position.

Y-axis bend depth

When an angle is programmed, this value is calculated. A higher value means a lower beam position.

Y-axis opening time

The desired opening time after a bend, programmed as a percentage of the maximum opening time.

Y-axis high speed

To enable high travel speed for the beam during this bend.

X-axis position

The desired backgauge position for this bend.

X-axis retract

Backgauge retract distance.

X-axis delay time

Delay time in seconds for X-axis and FD axis after a step change.

Bending force

P

The calculated bending force.

Function output

FD

Binary value for the programmable digital outputs. The number of available outputs depends on machine settings. The name also depends on machine settings, and is FD by default.

4.4 Program execution

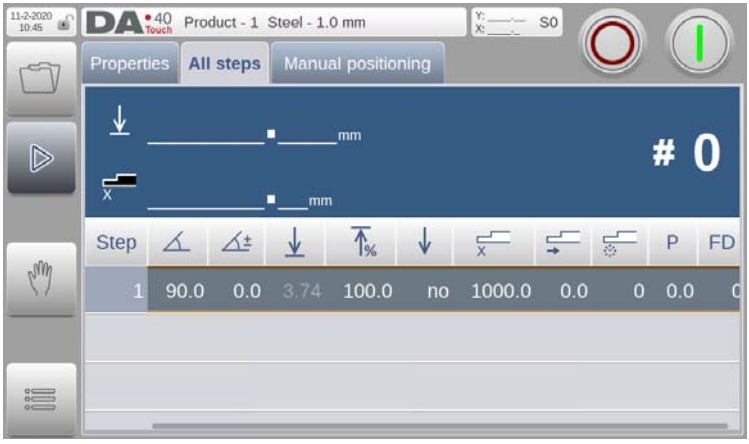
When all the program steps have been programmed (or an existing program is selected) the program can be executed to

bend the actual sheet metal parts. To switch to execution mode, press the green start button located in the upper right corner; this can be done on the ‘Properties’ tab or the ‘All steps’ tab.

To start a program, press ‘Start’. The control will begin execution of the step on which the cursor is placed.

To stop execution, press ‘Stop’.

When the control is started in ‘All steps’ the screen will look like below:

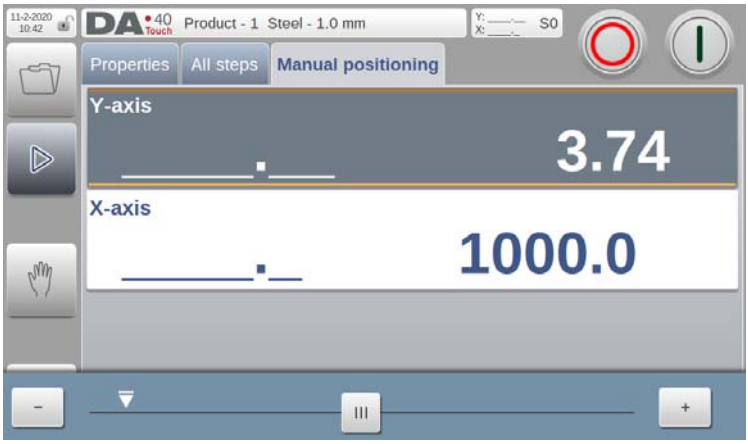


It highlights the active program step, actual Y-axis and X-axis positions and the value of the stock counter.

A program is repeated until 'Stop' is pressed or until the stock counter (#) has reached 0 after down counting.
A program can only be started when the machine is ready.

4.5 Manual positioning

On the ‘Manual positioning’ page in Manual mode and Automatic mode a slider at the bottom of the screen can be used to position the axis.



The distance moved with the slider determines the speed of the axis. When the slider is released, the axis stops. The buttons at each end of the slider can be used to fine-tune the axis position. When "sliding" the beeper gives feedback that the axis is moving.

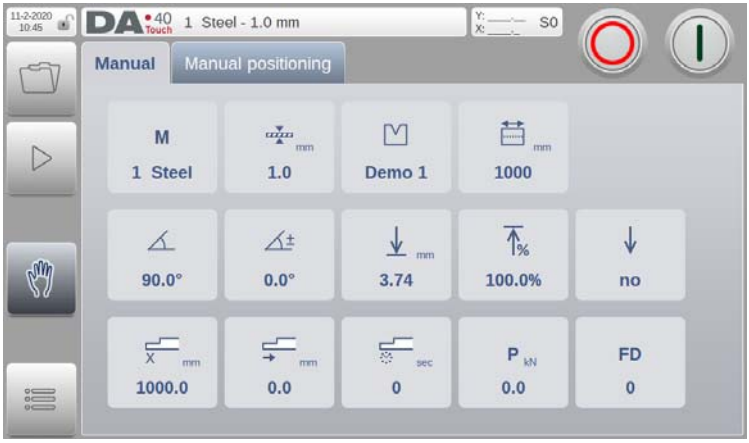
5. Manual mode

By tapping the navigation button Manual, the control is switched to Manual mode.

In this mode one bend step can be programmed and executed.

This chapter describes all possible parameters that can be programmed for a bend step. Note that most of these parameters are machine configuration dependent; it might be that some of the parameters shown are not present in the user interface.

5.1 Manual mode parameters



The position of the parameters in the Manual screen can be altered. To change the position of a parameter, keep its tile

pressed until its high-lighted and drag it to the desired position. Release the tile to fix the new position.

Material number

The material of the sheet. There are 6 material types available. Material properties can be programmed in Settings mode, as described in paragraph 6.3.

Thickness

The thickness of the sheet.

Product width

This value is used for bending force calculation.

Die ID

The name (ID) of the selected die, which is used for this product.

Angle

The desired angle value. This parameter is available when a tool is programmed.

Angle correction

When angle programming is used, this correction is used to correct Y-axis values. A positive correction means a lower beam position.

Y-axis bend depth

When an angle is programmed, this value is calculated. A higher value means a lower beam position.

Y-axis opening time

The desired opening time after a bend, programmed as a percentage of the maximum opening time.

Y-axis high speed

To enable high travel speed for the beam during this bend.

X-axis position

The desired backgauge position.

X-axis retract

Backgauge retract distance.

X-axis delay time

Delay time in seconds for X-axis and FD axis after a step change.

Bending force

The calculated bending force.

Function output

Binary value for the programmable digital outputs. The number of available outputs depends on machine settings. The name also depends on machine settings, and is FD by default.

5.2 Program execution

When all the manual mode parameters have been programmed the single bend can be executed. To switch to execution mode, press the green start button located in the upper right corner.

To start this bend step, press ‘Start’.

To stop execution, press ‘Stop’.

When the control is started the screen will look like below:

5.3 Manual positioning

The manual positioning function of the axis in Manual mode is identical to the manual positioning in Automatic mode, see paragraph 4.5.

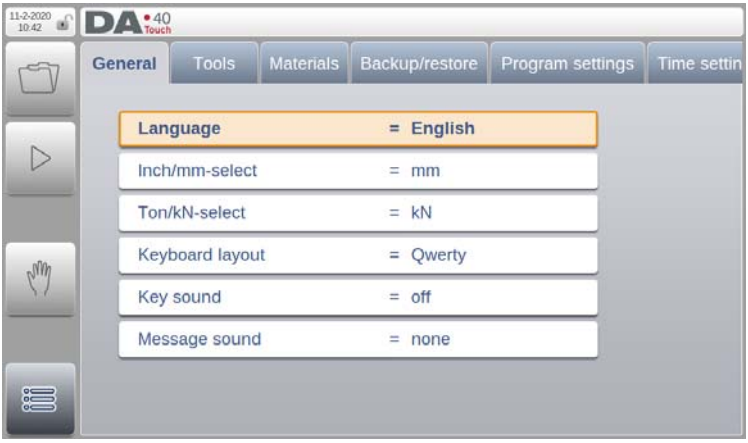
6. Settings mode

By tapping the navigation button Settings, the control is switched to Settings mode.

The Settings mode of the control gives access to all kind of settings which influence the programming of new products and programs.

The settings are divided across several tabs logically organizing the different subjects. In the following sections the available tabs and detailed settings are discussed. Navigation through the tabs can be done by just tapping them and selecting the required item to adjust. Since there can be more tabs than the screen can show in one view, dragging the tabs in horizontal direction enables to view and select all available tabs.

6.1 General



Language

The user interface language can be selected from the list. There are more available languages than initially shown. Scroll vertically by dragging the list up and down to see all available languages. Tap to select the desired language for the user interface.

Inch/mm-select

Select to use either Millimeters or Inches as the unit to be used.

Ton/kN select

Select to use either Ton or kN as the main unit to be used for all force data.

Keyboard layout

Upon choice one can select Qwerty, Qwertz or Azerty keyboard layout. Default layout is Qwerty.

Key sound

Switch the sound function of the input panel on or off. Default sound is on.

Message sound

When the Key sound is off it is still possible to have an acoustic alert in case of a message or warning.

- All messages: acoustic alert in case of any message
- Errors + Warnings only: acoustic alert only in case of an error or warning
- Errors only: acoustic alert only in case of an error
- None: No acoustic alert in case of any message

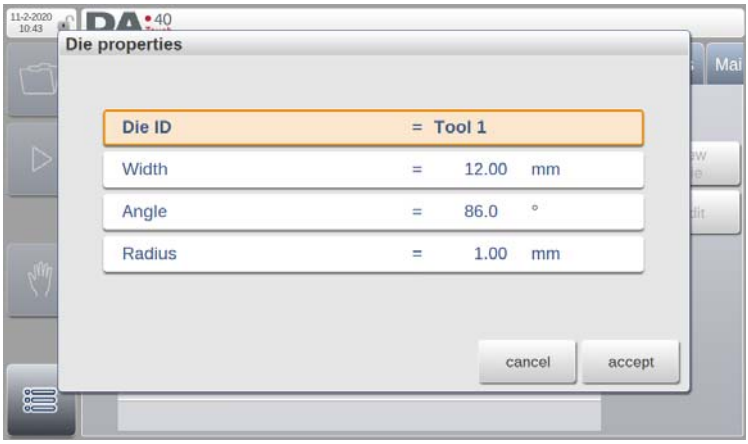
6.2 Tools

On the ‘Tools’ tab the available tools are listed; a new tool can be created or an existing tool can be edited.

To edit an existing tool simply tab on the tool and the tool properties window opens. Here the required changes can be made and confirmed with the accept button.

6.2.1 New tool

To create a new tool press the ‘new die’ soft key. A new dialog is opened where the tool properties can be programmed. These values will be used for automatic bend depth calculation during bend programming.



Die ID

A unique name or number to identify the tool. The maximum length is 25 characters.

Width

The V-opening of the die.

Angle

The angle of the V-opening of the tool.

Radius

The radius of the edges of the V-opening.

6.2.2 Copy/rename/delete a tool from memory

Over the Edit function a selected program can be manipulated:

Copy

Create a copy of the selected tool. When making a copy the DA-40T will prompt the keyboard for the user to provide a new name.

Rename
Change the name of the selected tool. When renaming the DA-40T will prompt the keyboard for the user to provide a new name.

Delete
Remove the selected tool from the memory. When deleting a tool from memory the DA-40T will prompt a pop-up to confirm the Delete action. This to prevent an accidental delete action. This action is permanent!

Delete all
Remove all tools from the memory. When deleting all the stored tools the DA-40T will prompt a pop-up to confirm the Delete all action. This to prevent an accidental delete all action. This action is permanent!

6.3 Materials

On the ‘Materials’ tab, 6 different materials with their properties can be programmed.

Material name

Name of the material, as it will appear in the programming screens. The maximum allowed length of the material name is 25 characters.

Tensile strength

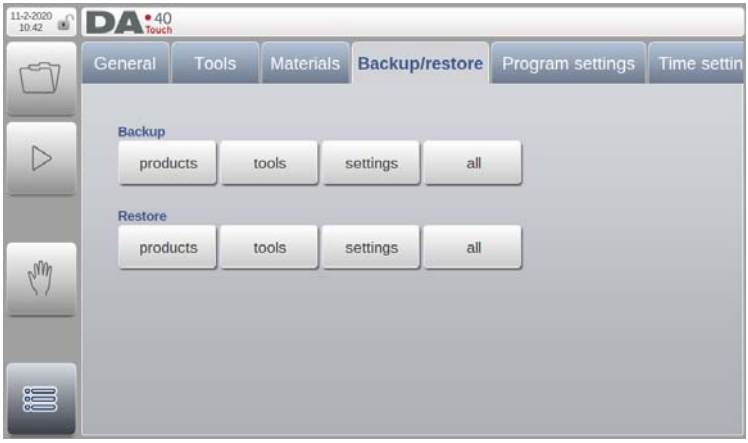
Tensile strength of the selected material.

E module

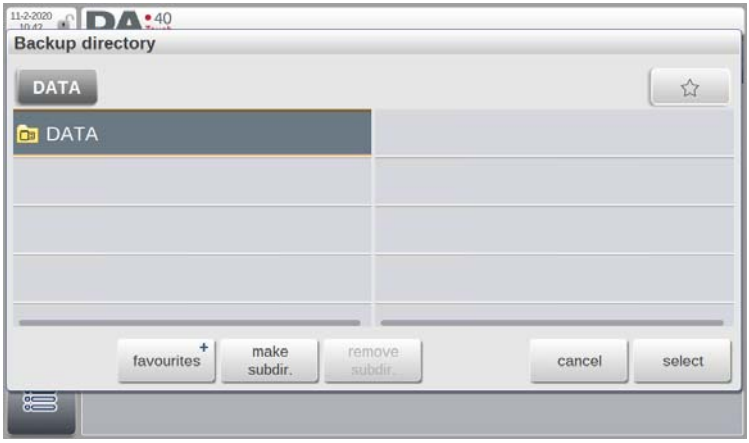
E-module of the selected material.

6.4 Backup / restore

The ‘Backup/restore’ tab offers the possibilities to backup and restore products, tools and settings to and from a USB memory device.



When backup (restore) products, tools, settings or all is selected for the first time a new window with a file browser is opened. In this window you can browse through the directory structure of your backup device. Tap the directory name on the right part of the file browser to look inside a subdirectory. To move one level up, tap the name on the left part of the file browser.



Favourites -> add to favourites
With ‘add to favourites’ it is possible to mark one or more specific directories as favourite. If there are favourite directories defined a  button will be present in the upper right corner. By tapping this button, the defined favourites are presented, making a quick selection of the directory possible.

Favourites -> edit favourites
In this screen the defined favourites can be given a logical name. Next time when opening the favourites by tapping the  button it will be displayed using this logical name. Favourites that are no longer needed can be deleted by tapping the ‘delete’ soft key.

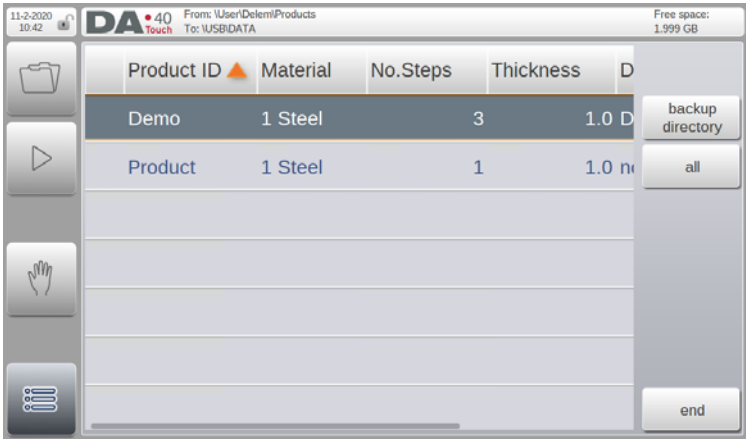
Make subdir.
Create a new subdirectory

Remove subdir.
Remove an existing subdirectory

Cancel
Exit the file browser screen

Select
Select the directory you are currently in

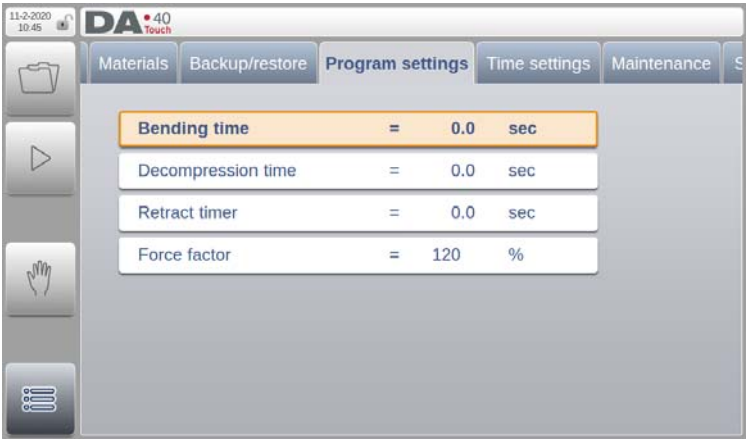
When the desired backup (restore) directory is selected a new window showing all the available products present in the memory is opened.



To backup (restore) a single product simply tap on the product to store it on the back-up device.

To backup (restore) all products choose the ‘all’ soft key.

6.5 Program settings



Bending time

The function of this parameter is depending on the machine design. Please contact the machine documentation or contact the machine supplier for the function of this timer.

Decompression time

The function of this parameter is depending on the machine design. Please contact the machine documentation or contact the machine supplier for the function of this timer.

Retract time

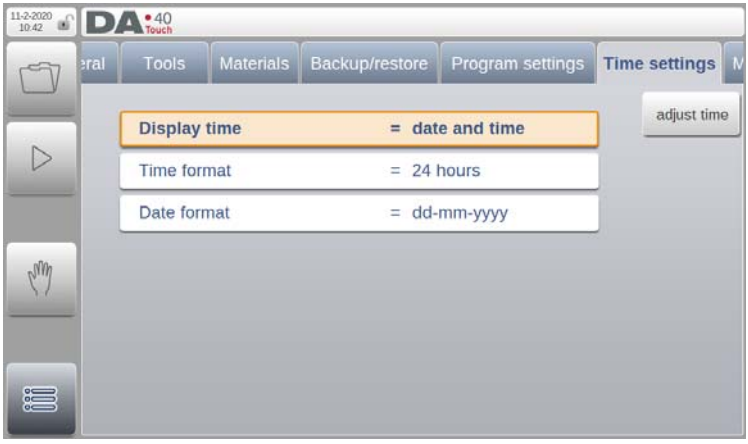
The moment of X-axis retract is delayed by the value programmed for this parameter.

Force factor

Percentage of calculated force which controls the pressure valve.

6.6 Time settings

In the ‘Time settings’ tab, the date and time as displayed in the upper left corner of the screen can be changed.



Display time

Display date and time, time only or no time at all on the title panel.

Time format

Display the time in 24 hours or 12 hours format.

Date format

Display the date in dd-mm-yyyy, mm-dd-yyyy or yyyy-mm-dd format.

Adjust time

To adjust the date and time. Adjusting the date and time will also adjust the date and time of the operating system.

6.7 Maintenance

On this tab maintenance related functions are located. Next to the machine hour counter and the machine stroke counter also functions to calibrate the backgauge and to store diagnostic data can be found here.

Hours

The number of hours the machine is running.

Strokes

The number of strokes the pressbeam has executed.

Lock screen

To lock the screen, and e.g. clean the screen without changing anything. The screen is unlocked automatically after 5 seconds.

Create .dat-file

Tapping Create .dat-file will store the most important product and control data, by default on the connected USB stick. This information can be helpful for the maintenance support.

Calibration point

Set the Y-axis calibration point. Refer to paragraph 6.7.1 for details.

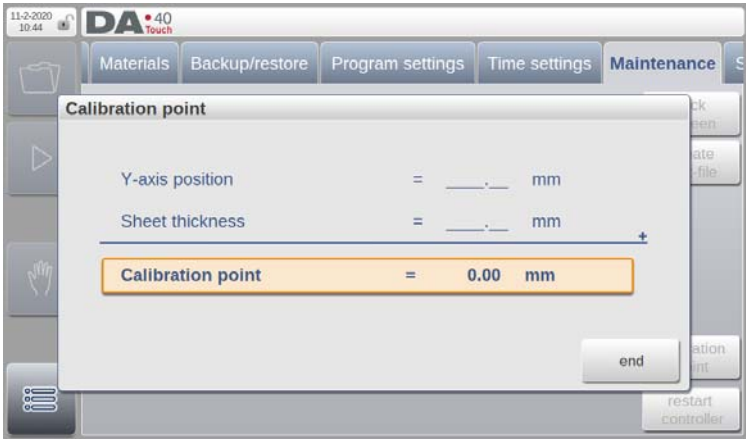
Restart controller
This will reboot the DA-40T system.

6.7.1 Setting the calibration point

To calibrate the bending depth calculation the calibration point must be programmed. This parameter defines the Y-axis position when the tools are closed. In other words, the Y-axis position that corresponds with the situation where the lowest point of the punch is at the same level as the upper side of the V-die (pinching point with sheet thickness = 0).
This procedure has to be repeated each time the height of the tools that are mounted in the machine have changed.

To set the calibration point, tap on the ‘calibration point’ soft key on the Maintenance tab in Settings mode.

A practical way to calibrate the machine is to place a sheet of material with known thickness between the tools and find the Y-axis position at which the punch just touches the sheet (pinching point) using the manual positioning function.



The first parameter indicates the Y-axis position. The second parameter is to define the thickness of the sheet that has been used for the calibration. When the thickness value is entered, the calibration point is calculated automatically.

6.8 System information

On this tab system information can be found. It shows the actual software version; software update functionality is available here as well.

Update software
With ‘update software’ the control can install a software update set from a USB stick. The directory browser will help to select the desired update and initiate the installation process.

Backup system
The backup system function makes a complete system backup to a USB stick. A unique time stamped file is written on the USB stick. This backup holds Delem software, OEM specific data as well as the user's files.

Restore system
The restore system function can be used to restore an earlier made backup of the system. During the process selection of what will be restored can be done.

Offline software
The offline software function generates an offline software setup file on a USB stick. This setup can be used to update an existing offline software. Using the matching offline software version with the control software ensures optimal compatibility of functions.

7. Diagnostics

If the service row is pressed for 2 seconds in Automatic mode or Manual mode the DA-40T will enter its built-in diagnostic mode.

The diagnostic mode can be switched off by tapping the service row again. These diagnostic screens are intended to be used on request of a service engineer from the machine manufacturer.

7.1 Axis state

The programmed position, actual position and control state for the X-axis and Y-axis are displayed.

Mentioned below are the possible machine states:

- S0 -> Stopped
- S1 -> Positioning
- S2 -> Wait for Retract

- S3 -> Wait for LDP
- S4 -> Opening
- S5 -> Wait for STEP
- S6 -> Wait for X-delay

7.2 Inputs and outputs

The status of all inputs, outputs and encoders is displayed.

7.3 Signals

The status of all digital input and output signals is displayed.

INTENTIONALLY

LEFT

BLANK

Delem

The DA-40T is a compact unit for control of conventional press brakes.

8094-921A

Everything under control