DCP 550 TAC Tip

CONDENSED GUIDE TO CONFIGURATION AND PROGRAMMING

INSTRUMENT CONFIGURATION

Before entering programs you must do some basic configuration of the DCP 550 in the following sequence. SETUP, PARAMETERS, PID GROUPS and EVENTS.

Note The instrument must be in the "ready" (i.e. Run or Hold not lit) mode. To put the instrument in the ready mode press the ***PROG*** and ***RUN/HOLD*** keys simultaneously. This resets the instrument and prepares the instrument for configuration.

SETUP (See page 7-4)

Defines the instrument range, control action (direct / reverse), setpoint limits, time units, etc.
Each configurable unit is identified by a code number, C-01 through C-90, (you won't use them all). The code number is displayed in the upper window when you press "***SETUP***". The message window displays the meaning of the code number currently displayed; for example "C-01 means "PV range number". You must make a selection for each configurable setup item.

The available choices for each setup item are listed on page 7-4 through 7-11 of the Product Manual.
Example Range number 48 is a linear range of 4-20 mA. To make your selection press "***Enter***" , (the lower display will flash), enter the number "48" using the arrow keys and press "***Enter*** " again to put your choice in to memory.
Proceed to the next code by pressing ***SETUP*** again
Note you can scroll through the various setup items in either directions with the up and down keys or scroll by 10's by using the left and right keys.

The "setup code C-62" establishes the program time base. Hr:Min, MIN: SEC, or 0.1 SEC).

You will follow the same procedure when you enter Parameters, PID Groups, and Events later on.

PARAMETERS (See page 7-12)

Defines keylock, auto-tune, PV bias, etc.
Each configurable parameter is identified by a code number (PA 01) through PA 120) which is displayed in the upper window when you push "***PARA*** ". The message window displays the meaning of the code number currently selected. Proceed to enter a selection on the lower display. Your choices are listed on page 7-12 of the product manual.

Follow the same procedures outlined under Setup.

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PID GROUPS (See page 7-18)

Sixteen groups of tuning constants (PID sets) can be assigned to program segments PV zones as follows:

- Nine PID sets (P-1 through P-9) can be set configured and any set can be assigned to any segment of a program.
- Seven PID sets (P-A1 through P-A7) can be configured and assigned to PV zones.

To configure the PID groups, push the ***PID*** key. The upper display and the message window will prompt you for Proportional Band value for the first group ("P-1"), the Integral value for the first group ("I-1"), the derivative value for the first group ("D-1"), manual reset for the first group ("RE-1") and (oL-1 oH-1)output low and high limits for the first group. Advance through the prompts sequentially by pushing the ***down*** arrow key.
Enter your values on the lower display per procedure outlined above under Setup. Then proceed with the additional groups, if you plan to use them. Use the ***down arrow*** key to advance through the prompts. It's not necessary to use all PID sets, so I would only setup the first set as a start.
If you do not know where to set these values start with a P-1 = 100, I-1 = 120 and D-1 =30. Later in the start up, you can Autotune the unit. This will automatically determine the PID settings.
You can add others as needed later, when you have completed entering your program profile. If you have entered more than one you will be able to choose from the PID sets and assign them to various segments to maximise your control.

EVENTS (See page 7-26)

There are 16 available Events (Digital outputs), any or all of which can be configured by code numbers to be a certain type of event. For example: Type 1 is a time event, Type 2 is a PV high event, and so on. There are many types from which to choose. (Type 1 through Type 144). See pages 7-27 though 7-37 in the Product Manual for a list of the available Event Types.

Note:

- Event types 1 through 23 are "Segment" events and are assigned to segments of a particular program
- Event types 64 through 95 are "Global" events, that is, you set them once and they apply to all programs.
- Event types 128 through 144 are "Status" events.

To configure the events hold in the "***Func***" and press the "***Para***" key simultaneously. The prompt in the upper display will read "EO1-t" , meaning: Event # 1 type. The lower display is looking for a # which represents the type of event desired. See page 7-27 in the Product Manual.
An entry of zero in the lower display means that event is not used. Enter your selection by following the same procedures as outlined above, under Setup. You will proceed with each step of the event configuration process by pressing the right or down arrow key sequentially. You can go back to the previous event settings with the left or up arrow key.
Some events also require the entry of an **"Auxiliary"** setting such as the "hysteresis value" for "PV HI Event". This prompt appears, after you have entered your event type.

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PROGRAM OPERATION

Entering a Program

When you have completed your basic configuration , the DCP 550 is ready to accept a program
A program consists of a series of Soak and Ramp segments. It's a good idea to first sketch out your profile with the soak and ramp values for ready reference, then simply copy your segment values one step at a time and create your profile on the DCP. Don't worry about the G.Soaks, Events, Etc. at this time. We'll get them later.
Before we start to program for the first time make a habit to check the code C-62 to see what the time "Unit" is set for because once selected all programs will be in that mode. OK it's now time to get into the Program Mode.
The Instrument must be in the Ready Mode, (i.e. Run or Hold not lit). Press the ***"Prog"*** key. Use the ***"Prog"*** key to increase the program # or the ***down*** arrow to decrease the program # .Once you have arrived at the program # you wish to enter a program in, press ***"Enter"***.
Note You can tell if a program is open if the lower display is all "----".

Now press both the ***"Func" and the "Prog" together*** at the same time. Momentary both displays will show a large number, then the **"PRG"** indicator illuminates, and a both upper and lower displays are all dashes. Press ***"Enter"*** and the upper display begins to flash. All programs must start with a soak. A good way to program is to use odd # as soaks segments, and all even # as ramps segments.

There is 3 different types of Ramp settings:

- **Ramp X** - See page 8-4 . Consists of a target setpoint and the time duration (elapsed time) for arrival (most commonly used)
  Ramp T - . See page 8-8. Consists of a target setpoint and the rate (in units per hour, minutes or seconds) of approach to setpoint.
- **Ramp E** - See page 8-12. Used to change the ramp rate with a digital input.

Enter the SP using the ***arrow keys*** and when the desired start temperature is in the window press ***"Enter"***. The lower display begins to flash all Zero's and is looking for a soak time, since this is a start point no need to enter any time so press ***"Enter"***.
We are now ready for segment #2. Press the ***right arrow*** and the segment # changes to "2". We are now ready to enter a ramp, being an even # we know it's a ramp. We must enter the setpoint that we are going to ramp to using the ***arrow keys***. Before we press "Enter" we must now make a decision as to whether we want to make this ramp a Ramp X or a Ramp T.

- If we want to make it a **Ramp X** just press ***"Enter"***, Ramp X will appear in the lower window.
- If we want to enter a **Ramp T** we must press and hold ***"Func" and while holding press "Enter"***. Ramp T will appear in the lower display.

The window's for Ramp X and Ramp T are different format.

- For **Ramp X** the window appears as 00:00 if we have selected the units of time as "Hours" then the leading 00's represent hours and the trailing 00 represent Minutes If we want the time to complete the ramp to be 30 minutes we would enter 00:30.
- If we are using a **Ramp T** the window appears as 0000 and we wanted to ramp at 40 degrees per minute, remembering that we are using the hour time unit, we must express the units as degrees per hour. This is very simple just multiply the number of degrees per minute times the number of minutes (60). In this case 40 x 60 = 2400. In this case we would enter "2400", and the ramp will be at the rate of 40 degrees per minute.

Continue to enter your program profile and when you have completed all the soaks and ramps it's time to enter the rest of the program. In most cases all soak segments except #1 will be Guaranteed soaks (G.Soaks). Every segment of the program may have several associated settings that my also be entered. When you have entered the soak and ramp values, press the ***down arrow*** key to program the following data in the sequence shown below.

EVENTS

All segment events which you have previously configured can be assigned to any segment as required by your program. This is where the sketch of your program profile will be a big help. You will only see the Segment events that you have configured. You forgot one? No problem, just save the program and configure the one you forgot and go back into the program mode and continue where you left off.
When the event prompts appear, press ***"Enter"***, the upper display will flash. It's looking for the trip value for the event. If it's a time event, the upper display shows the on time and the lower shows the off time. Choose the appropriate values and press ***"Enter."***

Hint

If you want to have the time event on for the complete segment, enter *0* for the "on" time and make *no entry (----)* in the "off" time. This will prevent a problem when you have a 30 minute soak and a time event set for 0 and "off" set at 30 minutes and someone decides to add more soak time to the segment and forgets that there is a time event on this segment.
PV events can be set off, by setting the trip value to the lowest possible SP using the down arrow. When "OFF" appears, the event will be not be used in future segments.

PID SETS
MV OUT LIMITTER

See page 8-24 for description. Code C-58 effects this operation. This prompt allows you to set the PID group # to any particular segment. If you have previously configured more then one PID set you can now assign them to specific segments. If you assign one to a segment it will remain in effect till another one is assigned in a later segment. If you do not assign a PID set then the DCP uses PID set #1.

If you found at the higher temperature ranges you got better control with a different set of PID settings then you received at lower temperature ranges, you can assign that group to the higher SP segments. Once you enter a group it remains in effect till you enter another group. You have up to 9 different groups you may use.

The first line is **"PId"** group. Enter the # of the PID group you want to use. If no entry is made, PID 0 will be used, which is PID set 1. The second line is output group, **"otL"** Enter the # of that group or another group which has the output limits you want to use. In most cases it will be the same as the PID group. The exception would be where the same PID group was used but you might want to restrict the output to a different group at the beginning of the program to prevent overshoot.

G. SOAK TYPE
BAND

See Page 8-27 for description. Code C-59 effects this operation

This code allows you to set the soak segments to a guaranteed soak as to opposed to a regular soak. There are three types of G.Soaks.

- **Type 1** Looks only at the beginning of the segment
- **Type 2** Looks only at the end of the segment
- **Type 3** Always monitors the segment

The second line asks for the G.Soak band. Enter the boundary in degrees of the setpoint you want to reach before you start timing.

Example Type 3 soak and you want to have a guaranteed soak at 300 degrees. A setting of 5 degrees would mean that at 295 degrees the timing would start or if coming down from a higher temperature to 300 degrees the timing would start at 305 degrees. Any time the PV is beyond this boundary, the soak timer will stop.

PV SHIFT "SHFt"

See page 8-30 Code C-59 effects this operation.

This code allows you to shift the PV (process variable) input in each segment. Advance to the segment you wish to shift the PV. Press the ***down*** arrow till **"SHFt"** appears in the message window, press ***"Enter"*** and enter the amount of PV shift you wanted. If you had a certified thermocouple and knew the error at different points or knew the furnace needed an offset at certain points, entrees could be made in various segments to compensate these differences. Say you knew the thermocouple read 2 degrees high at 300 degrees. You could enter +2 degrees and now the indicated PV would still read 300, but if you put a calibrated signal in the instrument would read 302 degrees. In effect you have just corrected the thermocouple error at 300 Degrees.

Setpoint offsets could also be corrected this way. Once a change is made it will continue though out the program till a new entry is made, so it might be necessary to make entrees in all segments. Great care should be exercised in using this prompt.

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REPEAT SETTING "rP"

See page 8-33 Code C-59 effects this operation. This code allows you to repeat a portion of the program a number any # of times. At the prompt "rP" press the **right arrow** till the segment you want the repeat to end . Press ***"Enter"***, the indication will flash. enter the segment # you wish to return to start the repeat process, press ***"Enter"***. The lower line will begin to flash, enter the # of times you want the segment to repeat, press ***"Enter"***

Example : In program #1, you have a 7 segment program and you wanted to repeat segments 3 though 5, three times. You would get into the program mode for program #1 and advance to segment #5. Press the **down arrow** key till **"rP"** appears in the Message window. Press ***"Enter"*** then the up arrow till "3" appears in window. Press ***Enter*** and the lower window flashes, enter the # of times you want segments 3-5 to repeat, in this case "3", press ***"Enter"***, then ***"Disp"*** to store information in memory. When you run the program it will start at segment #1 proceed through to segment #5 then return to segment 3 through 5 two more times, then complete the cycle.

PV START "P.StA"

See page 8-36 Code C-60 effects this operation This prompt allows you to make a ***"hot start"***. If you wrote a program and the first segment called for a starting SP at say 75 degrees. The oven or furnace might be at room temperature on the first run of the day, but after the first run it might be warmer. The next run would again start ramping at 75 degrees which would be a waste of time since the oven or furnace might be at 150 degrees. With this prompt, the programmer would automatically start ramping at 150 degrees or the current PV, thus saving the wasted time ramping to the current PV. From segment #1 press the ***down*** arrow till **"P.StA"** appears in the window. There are 3 selections to choose from, see page 8-36, #1 is the one normally used (Rising PV start). Enter your choice, then press ***"Enter"***.

PROGRAM CYCLE " CyCL"

See page 8-38 Code C-60 effects this prompt. This prompt allows you to cycle a complete program any # of times you want. At segment #1 press the ***down arrow*** till **"CyCL"** appears in the message window. Enter the number of time you want to cycle this program, then press ***"Enter"*** .

PROGRAM LINK "P.LI n"

See page 8-40 Code C-60 effects this prompt. This prompt allows you to link one program to another. From the last segment of the first program you want to run, press the ***down arrow*** till **"P.LI n"** appears, then press ***"Enter"***. The lower line begins to flash. Enter the program # which you wish to link to the first program, then press ***"Enter"***. When the first program finishes, the second program will run .

TAG SETTING "tAg"

See page 8-42 This prompt allows you to put a name on each Program. Press the ***up*** or ***down*** arrow till **"tAg"** appears in the message window. Press ***"Enter"*** the lower display will begin to flash "-". Press ***up*** or ***down*** arrows till the desired letter or character appears that you want to enter. Press the ***right*** arrow to the next position and repeat procedure till desired name is entered. There are eight spaces available. I would suggest that a channel # be included in entry for ease of locating other channels. When complete, press ***"Enter"***. This prompt can be left as is from the factory unless you have plenty of time on your hands as it's rather time consuming.

START UP PROCEDURE

Tuning / Auto Tuning (Page 9-6)

Before placing the programmer in full production , proper tuning values are needed for the unit to control at the desired SP. If you have no idea where to set the PID values, then I would recommend using Auto Tune.
In the Parameter section set code **PA08 to 1 or 2**. Run a program, which has a SP near the operating range of the system. While the program is running, press the "*AT*" key. The AT LED will flash indicating that the unit is self tuning. When the AT LED has stopped flashing, the PID values have been stored.

EDIT PROCEDURES

COPY A PROGRAM (Page 8-27)

Select the program you wish to copy (The Source Program). Press and hold the ***up*** arrow, then press the ***Prog*** key. "Copy" will appear in upper display The lower display begins to flash and the next available open program appears. You can select this one, or by using the up or down arrows select the one of your own choosing. Only unused programs will appear. Press ***"Enter"*** and the program is copied. This is very handy because it's much quicker to edit an existing program then enter one from scratch.

DELETE A PROGRAM (Page 8-50)

Select the program you wish to Delete. Enter the program mode ***(Func/Prog)***. Select segment #1 using the arrow key. Press ***"Enter"*** and the upper display begins to flash. Hold down ***"Func"*** and press ***"Clear"***. "Clear" now appears in the upper display. Press ***"Enter"*** and your program is deleted.

INSERT A SEGMENT (Page 8-47)

Put instrument into the program mode, ***"Func"/ "Prog"***. Advance to the desired segment using the arrow key. Hold down ***"Func"*** and press ***"Enter"***. The upper display shows **"INS"**. Press ***"Enter"*** and proceed to enter the segment values per normal procedure.
Note: all segments advance one position. If you want to insert a Soak segment, then two segments would be needed.

DELETE A SEGMENT (Page 8-47)

Put instrument into program mode, *"Func"/ "Prog"*. Advance to the desired segment using the arrow key. Hold down *"Func"* and press *"Enter"*. The upper display shows **"INS"**. Push the ***down arrow*** The display reads **"DEL".** Push *"ENTER"*. Your segment will be deleted. Be aware that by deleting a Ramp segment, now make the next segment a Ramp segment.

DELETE AN EVENT FROM A SEGMENT

Choose a program number and enter the program mode, *"Func"/ "Prog"*. Using the arrow keys, select the event in a particular segment that you wish to delete, then press *"ENTER"*. The Upper display will flash. Hold down *"Func"* and press *"Clr"*. The event will be removed from the segment.

VERIFY A PROGRAM IN READY MODE

Choose the program you wish to Verify in program display, then press *"Enter"*. Now enter the program mode *"Func"/ "Prog"*.. Sound familiar? Yes you are in the program mode and you can verify, change anything, add anything Practically do any thing you want. When done press *"Disp"* and all your changes are stored in memory.

VERIFY A PROGRAM IN THE RUN MODE

At any point during a program run, you may enter the program mode by pressing the *"Func"/ "Prog"* keys. You can now verify the program you are now running and make changes to the program. All this while the program continues to run. When finished press *"Disp"* and all indications return to normal and the program never skipped a beat.

VERIFY A DIFFERENT PROGRAM THEN THE ONE YOU ARE RUNNING

During a run of a program ,enter the program mode as if you were going to verify the program you are presently running. Now press the *"Func"/"Prog"* keys a second time and the program # begins to flash. Using the arrow keys place the program you wish to Verify in the program window and press *"Enter"*.
You can now verify this program and make any changes you wish .When done, just press *"Disp"* to store to memory and again you never missed a beat on the running program.

ENTER A PROGRAM WHILE RUNNING A PROGRAM

The same as above but just go to an empty program and start programming !!

PROGRAM STORAGE

All of the configuration program data that you have entered can be conveniently stored on a memory card which is about the size of a credit card. For the end user it saves a lot of time should all the programs become lost or they wanted to transfer all programs to another controller.

The memory cards are available in three capacities:

8K Stores 20 programs
16K Stores 52 programs
64K Stores 99 programs