



DCP 216 TAC Tip

CONDENSED GUIDE TO CONFIGURATION AND PROGRAMMING

INSTRUMENT CONFIGURATION

Before entering programs you must do some basic configuration of the DCP 216 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 12)

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-37; (you won't use them all). The code number is displayed in the upper window when you press "*SETUP*". The lower window displays the code number setting, for example "C-6 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 50 of the Product Manual.

Example: Range number 2 is a thermocouple range of 0 to 1600 degrees F. To make your selection press "*ENT*", (the lower display will flash), enter the number "2" using the arrow keys and press "*ENT*". Proceed to the next code by pressing *SETUP* or the down arrow key.

Note: The "setup code C-29" establishes the program time base. Hr: Min or MIN: SEC).

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

PARAMETERS (See page 19)

Defines keylock, auto-tune, PV bias, G soak band etc. Each configurable parameter is identified by a code number, which is displayed in the upper window when you push "*PARA*". The lower window displays the setting of the code number currently selected. To make your selection press "*ENT*", (the lower display will flash), enter the setting using the arrow keys and press "*ENT*".

Proceed to the next code by pressing *PARA* or the down arrow key.



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PID GROUPS (See page 30)

Nine groups of tuning constants (PID sets) can be assigned to program segments.

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 *PID* or *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 *PID* or *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 41-43)

There are 4 available Time Events (Digital outputs), and 2 relay outputs (contact closure/open).

To configure the relay events output press the "*Para*" key until "Et1 or Et2 appears. The lower display is looking for a # which represents the type of event desired. See page 19 in the Product Manual. Enter your selection by following the same procedures as outlined above, under Setup.

Some events also require the entry of an "**HYST**" setting such as the "hysteresis value" for "PV HI Event". This prompt appears, after you have entered your event type.

Time events 1 through 4 are pre configured. They can only be energised while running a program



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PROGRAM OPERATION

Entering a Program

When you have completed your basic configuration, the DCP 216 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-29 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 "**ENT**".

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 "**ENT**" 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.

Enter the SP using the **arrow keys** and when the desired start temperature is in the window press "**ENT**". The lower display begins to flash all ---- and is looking for a soak time, since this is a start point no need to enter any time so press up arrow key till 00.00 appears, then press "**ENT**".

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**, then press "**ENT**". The lower display begins to flash all ----, press up arrow key till 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. Use the arrow keys to make your setting, then press "**ENT**".

Continue to enter your program profile and when you have completed all the soaks and ramps it's time to enter the other details 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 may 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.



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EVENTS

All Time or Relay events that 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 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 configured for **PV or Dev relay event**, the EV 1 or 2 will light and the lower display will show ----. It's looking for the trip value for the event. Use the arrow keys to make your setting, then press "**ENT**".

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 "**ENT**."

Hint:

If you want to have the time event on for the complete segment, enter 0 for the "on" time and make 0 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.

PID SETS

This prompt allows you to set the PID group # to any particular segment. If you have previously configured more than one PID set you can now assign them to specific segments. If you assign one to a segment and 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 than 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 bottom line is "**Pid**" group. Enter the # of the PID group you want to use and press "**ENT**."

G. S. (Guaranteed Soak)

Setting this prompt to "YES" is setting a predetermined boundary around a SP where the soak timer will not start until the PV is within this boundary. The bottom line can be set to either "YES or No". Enter the value you wish to use, and press "**ENT**." The **G soak band** is set by **G.S.b.d.**, in the Parameter group.

Example: You want to have a guaranteed soak at 300 degrees. A **G.S.b.d.** 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.

Note: The timer is not stopped after the PV has entered the G. Soak band once.



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PV START "P.StA"

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.

From segment #1 press the *down* arrow till **"P.StA"** appears in the window. The bottom line can be set to either **"YES or No"**. Enter the value you wish to use, and press *"ENT"*.

PROGRAM CYCLE "CyCL"

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 *"ENT"*.

PROGRAM LINK "P.LI n"

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 *"ENT"*. The lower line begins to flash. Enter the program # which you wish to link to the first program, then press *"ENT"*. When the first program finishes, the second program will run.

PV SHIFT "SHFt"

Set code C 20 to 2 or 3.

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.

Example: 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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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.

Autotune

In the Parameter section set code **At 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 35)

Put instrument into ready mode, "**Prog**" & "**Run/Hold**". 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 "**ENT**" 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 36)

Put instrument into ready mode, "**Prog**" & "**Run/Hold**". Select the program you wish to Delete. Enter the program mode (**Func/Prog**). Press "**ENT**" and the upper display begins to flash. Hold down "**Func**" and press "**Clear**", your program is deleted.

DELETE AN TIME 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 "**ENT**". The Upper display will flash. Hold down "**Func**" and press "**Clr**".

Press the down arrow. The Lower display will flash. Hold down "**Func**" and press "**Clr**". The event will be removed from the segment.



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VERIFY A PROGRAM IN READY MODE

Choose the program you wish to Verify in program display, then press "*ENT*". 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 # will increase. Using the "*Func*"/ "*Prog*" keys select the program you wish to verify in the program window.

Once the program is selected, you can use the arrow to verify the data. 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 goes to an empty program and start programming!