SERIAL PROGRAMMING COMMANDS

```
Note:   guide to "data" or "cmd ok" in second column

"ok" indicates that this can only be a command.

       "data" means that only data is returned from the query.
        Cannot be a command.

       "data/cmd ok      means that when the 3 character mnemonic is
                         sent without data, it is a query with "data"
                         returned.

                         A "three character mnemonic with data" is a
                         command with "ok" returned, showing that the
                         command was valid and executed, and the data
                         was accepted.
```

mnemonics   **return**

Direct Unit Control via serial port:

```
ADR          data              // READ serial address

LCL          ok                // return to local mode
RMT SELECT   ok                // set to remote mode
RUN          ok                // starts operation (run prog#  step#<cr> or run
STP          ok                // stop  halts operation
RES          ok                // reset run
PRR          ok                // reset run
ABT          ok                // abort the current running program & reset to step 1
```

Monitoring values via serial port:

```
MOD      data              // read mode (run, stp, eop, pau, dly, nul)
STA      data              // display status
SP1      data              // read current Setpoint #1
SP2      data              // read current Setpoint #2
SP3      data              // read current Setpoint #3
PR1      data              // read current process variable #1
PR2      data              // read current process variable #2
PR3      data              // read current process variable #3
TIM      data              // read time to go in current step
IFS      data              // interface status (RMT, LCL)
CSN      data              // current run step number
CPN      data              // current run program number
CTG      data              // read no. of cycles to go in current program
LTG      data              // read no. of loops to go in current nested loop
AEV      data              // actual events ON
ALM      data              // alarm string
FRE      data              // number of free frames remaining
```

```
VER       data                 // software version number
DAT       data                 // software version date
PW1       data                 // power output from channel 1
PW2       data                 // power output from channel 2
PW3       data                 // power output from channel 3


Manual Control via serial port:

CH1       data/cmd ok          // controller mode for chn 1 (MAN,  PROGRAMMER, %PWR)
CH2       data/cmd ok          // controller mode for chn 2 (MAN,  PROGRAMMER, %PWR)
CH3       data/cmd ok          // controller mode for chn 3 (MAN,  PROGRAMMER, %PWR)
MS1       data/cmd ok          // manual Setpoint for channel 1
MS2       data/cmd ok          // manual Setpoint for channel 2
MS3       data/cmd ok          // manual Setpoint for channel 3
CM1       ok                   // clear manual channel 1
CM2       ok                   // clear manual channel 2
CM3       ok                   // clear manual channel 3
ESR       data/cmd ok          // events source ( returns MAN or PRG): send M or P
MEN       data/cmd ok          // manual event on
MEF       data/cmd ok          // manual event off
MEC       ok                   // manual events clear all
MBI       data/cmd ok          // manual thermoboost increase thermal boost
MBD       data/cmd ok          // manual thermoboost decrease thermal boost
M%1       data/cmd ok          // manual pct output for channel 1 (must be in %PWR)
M%2       data/cmd ok          // manual pct output for channel 2 (must be in %PWR)
M%3       data/cmd ok          // manual pct output for channel 3 (must be in %PWR)



Configuration via serial port:

ADR       data                 // READ serial address
SVG       data                 // save current configs (input & output) to file
RSG       returns ok after stored data send to unit,
                               // restore configs (inputs & outputs)from file
CRM       data/cmd ok          // system configuration (3CH, 2CH, 1CH, 2FT, 1FT)
UN1       data/cmd ok          // channel 1 units (C, F, A, P, or U)
UN2       data/cmd ok          // channel 2 units (C, F, A, P, or U)
UN3       data/cmd ok          // channel 3 units (C, F, A, P, or U)


CH1       data/cmd ok          // controller mode for chn 1 (MAN PRG %PWR)
CH2       data/cmd ok          // controller mode for chn 2 (MAN PRG %PWR)
CH3       data/cmd ok          // controller mode for chn 3 (MAN PRG %PWR)
FTH       data/cmd ok          // fasttrack high limit
FTL       data/cmd ok          // fastt rack low limit
ESR       data/cmd ok          // events source (MAN   PROGRAMMER)
RSP       data/cmd ok          // turn on or off the OK and ? response (default 1)

Programming via the serial port:

FRS                            // retrieve program from FLASH to DRAM,
                                  add a new first Step
PRN       data/cmd ok          // read/select current program number
STN       data/cmd ok          // read/select current step number
INS       ok                   // insert program step
```

```
DES      ok                  // delete step
DEP      ok                  // delete selected program from FLASH program
SAV      ok                  // make certain FLASH is updated, write from DRAM to
                                FLASH


SLN  "a special command"  // program an entire step line. preface to sending
                               entire step
GLN      data                // get an entire step line

SS1      data/cmd ok    // select Setpoint 1
SS2      data/cmd ok    // select Setpoint 2
SS3      data/cmd ok    // select Setpoint 3
SH1      data/cmd ok    // select high limit 1
SH2      data/cmd ok    // select high limit 2
SH3      data/cmd ok    // select high limit 3
SL1      data/cmd ok    // select low limit 1
SL2      data/cmd ok    // select low limit 2
SL3      data/cmd ok    // select low limit 3
GS1      data/cmd ok    // guaranteed soak chan 1
GS2      data/cmd ok    // guaranteed soak chan 2
GS3      data/cmd ok    // guaranteed soak chan 3
TBI      data/cmd ok    // thermoboost_inc
TBD      data/cmd ok    // thermoboost_dec
STM      data/cmd ok    // select STEP time
EVN      data/cmd ok    // events on
TYP                     // read/set step type
EOP                     // eop step
LOP                     // loops or cycles
GTO                     // goto
GTI                     // goto if
PAU


SPG  "a special command"  // send entire program line by line, starting
                               with "confg, units 1, units 2, units 3"
GPG      data            // get an entire program line by line starting w/
                                      "confg, units 1, units 2, units 3"


PRL                     // print program list
STL                     // print step list
```

PID Adjustments via the serial port:

```
PD1      data/cmd ok    // current PID set in use for chn 1 (1,2,3,4,B)
PD2      data/cmd ok    // current PID set in use for chn 2 (1,2,3,4,B)
PD3      data/cmd ok    // current PID set in use for chn 3 (1,2,3,4,B)

C1P xy   data/cmd ok    // current edit PID set for chn 1(x= 1 to 4, y= I or D)
C2P xy   data/cmd ok    // current edit PID set for chn 2(x= 1 to 4, y= I or D)
C3P xy   data/cmd ok    // current edit PID set for chn 3(x= 1 to 4, y= I or D)


PBN      data/cmd ok    // proportional band
PGN      data/cmd ok    // proportional gain
INT      data/cmd ok    // integral gain
RWI      data/cmd ok    // reset windup inhibit
UWF      data/cmd ok    // unwind factor
ICP      data/cmd ok    // integral clipping
```

3

```
DER        data/cmd ok      // derivative gain
RAF        data/cmd ok      // rate factor
IDB        data/cmd ok      // integral dead band
```

PID Action internal monitoring via the serial port:

```
CI1        data             // current integral term channel 1
CI2        data             // current integral term channel 2
CI3        data             // current integral term channel 3

IS1        data             // current integral sum channel 1
IS2        data             // current integral sum channel 2
IS3        data             // current integral sum channel 3

CP1        data             // current proportional term channel 1
CP2        data             // current proportional term channel 2
CP3        data             // current proportional term channel 3

CG1        data             // current gain channel 1
CG2        data             // current gain channel 2
CG3        data             // current gain channel 3

CD1        data             // current derivative term channel 1
CD2        data             // current derivative term channel 2
CD3        data             // current derivative term channel 3

CE1        data             // current error channel 1
CE2        data             // current error channel 2
CE3        data             // current error channel 3
```

Current PID Factor Values:

```
IG1        data             // CURRENT GAIN FACTOR FOR CHANNEL 1
IG2        data             // CURRENT GAIN FACTOR FOR CHANNEL 2
IG3        data             // CURRENT GAIN FACTOR FOR CHANNEL 3

DG1        data             // CURRENT RATE FACTOR FOR CHANNEL 1
DG2        data             // CURRENT RATE FACTOR FOR CHANNEL 2
DG3        data             // CURRENT RATE FACTOR FOR CHANNEL 3

RW1        data             // CURRENT RWI FACTOR FOR CHANNEL 1
RW2        data             // CURRENT RWI FACTOR FOR CHANNEL 2
RW3        data             // CURRENT RWI FACTOR FOR CHANNEL 3

CS1        data             // CURRENT SPAN FOR CHANNEL 1
CS2        data             // CURRENT SPAN FOR CHANNEL 2
CS3        data             // CURRENT SPAN FOR CHANNEL 3

UW1        data             // CURRENT UNWIND FACTOR FOR CHANNEL 1
UW2        data             // CURRENT UNWIND FACTOR FOR CHANNEL 2
UW3        data             // CURRENT UNWIND FACTOR FOR CHANNEL 3
```

Serial commands added for user units :   (ver 1.201 and later)

User Units – user units can now be assigned from the controller front panel. The default is "p" displayed on the main screen as user units. The letter "m" can be substituted instead of the "p" by sending a command UU1 M<cr> from the serial port. UU1 for channel 1, UU2 for channel 2 or UU3 for channel 3.

When a query of UU1 is sent, the reply is either "p" or "m" depending on the previous serial selection for the "User Units"

Note: If a query of UN1 is sent , the reply can be "C", "F", "A", "P" or "U".
If you wish to know what User Unit is in use if you receive a "U", you must send the query "UU1" to receive the reply of "p" or "m".

The commands for reading and setting up the Blended PID sets are now available.
   (ver 1.201 and later)

The existing command PD1, PD2 and PD3   as queries will return 1,2,3,4 of B (for blended). If sent as a command with the argument s of 1,2,3,4 or B. the channel will be set accordingly.

The newly added command (and query) are:

For channel 1 as an example -   PB1 <pid set> <E or D> <SetPoint Value>

Where: "pid set" is 1,2,3 or 4
     "E or D" is Enabled or Disabled
           "SetPoint Value" is the setpoint at which the PID value used in the
                 interpolation algorithm

    Note: The query is composed of two elements: "PBn m "   where

            n = channel number (1,2 or 3)
            m = pid set number (1,2,3 or 4)

        The reply has two elements: "E (or D)" and "Value of the setpoint"

    For example, a query of "PB1 1" (channel 1, pid set 1) might return the
           following: E   0   where E means Enabled and 0 means
                        0 degrees setpoint value.

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5