

This Application Note applies to the Unidrive M100 – M400 Drive Series

Custom Speed Display Scaling

This document will provide instructions on how to scale the displayed value of a drive parameter on the keypad. For M400 users, keypad and PLC options allow the user to customize a displayed value further. Depending on the application, a modified display value may prove to be more relevant and useful to the customer's needs.

NOTE: This application note only describes methods to modify a DISPLAYED reading, NOT to modify the actual parameter values that control the drive's processes.

LED Keypad

To scale the displayed parameter, the user must simply change value of Pr. 11.021 to the scale factor that is desired for the displayed parameter. This parameter is available on all Unidrive M series drives. The following is a list of instructions to set up the display scaling:

- 1) Make sure the drive is in the Inhibit (Inh) state or Ready (rdy) state before proceeding.
- 2) On the keypad, make sure Pr. 00.010 is set to "ALL" to access all menus.
- 3) Navigate to Pr. 11.018. Change the value to whichever drive parameter the customer wants displayed on the keypad when the motor is running. The default value is Pr. 2.001, which means that the drive displays the Post Ramp Reference.
- 4) Go to Pr. 11.021 and set the custom scale factor for the displayed parameter. The default value is set to a scale factor of "1.000."
- 5) Go to Pr. 11.000, enter "SAVE," then press and hold the Reset button until the "SAVE" value changes to "NonE" (Saving parameters on the keypad).

CI-Keypad LCD

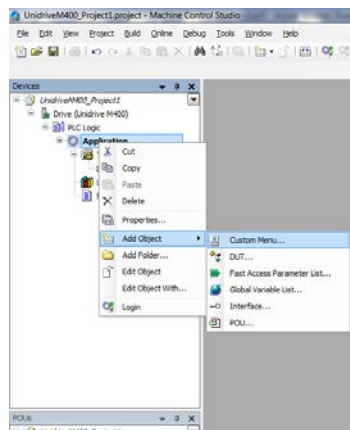
The Unidrive M400 provides the option of an LCD keypad that is able to simultaneously display statuses and two parameter values on its screen. Parameter names are even displayed as a user navigates through the parameter list. To scale a displayed parameter, the user can follow the same instructions used for the LED keypad. However, the user can ONLY scale the topmost parameter (whatever is in Pr. 11.018) that is displayed on the keypad. Depending on what the customer needs, the following is a list of additional options to further modify the display value on the keypad.

- Set Pr. 11.019 to the same value as Pr. 11.018 to display one parameter that can be scaled, if required.
- Hold the Back button, navigate up to Keypad.01, and turn OFF "Show Units" to disable all units displayed, if necessary.
- Hold the Back button, change "Language" to preferred language, optional.

Machine Control Studio and Menu 30

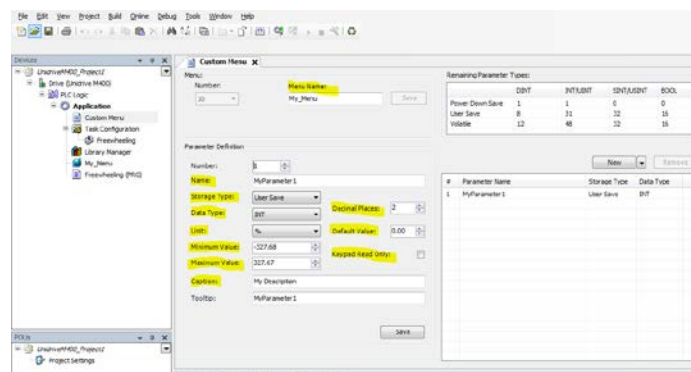
The Unidrive M400 also allows users the option to display custom parameters through the PLC programming software, Machine Control Studio (MCS). Once an application is created in MCS, the user can attach a custom menu that the drive will recognize as Menu 30. Here, the user can establish the parameter's name, type, units, and description. The following instructions assume that the user has already set up a either a freewheeling or clock POU in a new MCS project, and is connected to the drive.

- 1) Right click on the *Application* label in the *Devices* pane ("Your Project" → *Drive* → *PLC Logic* → *Application*). Select *Add Object* → *Custom Menu*.



This will open a window called *Custom Menu Editor*. Click *Open*; this will open the editor on the rightmost pane titled *Custom Menu*. The sections to the left of the editor will be inaccessible until a new parameter is created. The right hand side of the editor shows two tables, the topmost one labeled *Remaining Parameter Types*. This table informs the user of the available data types and memory behavior that is allocated for this custom menu. The bottom table shows the custom parameters created for the custom menu.

- 2) Proceed to creating a new parameter by clicking the *New* button on the right of this editor. Fill out the highlighted fields, then click *Save* on the bottom to create the parameter.



The user can edit to text fields for MConnect display purposes only (with the current version of MCS). The *Units* field allows the user to select from a list of units that the new parameter will take. This list only contains drive relevant units, such as “rpm,” “μs,” or “mA.” For non-drive related units, the user can select “UU” for “User Units,” or “%.”

At this point, the custom parameter is now a part of Menu 30. If the user saves the PLC program in the drive, the parameter will appear in Menu 30 but will only display its default value. To perform any sort of special scaling/offsetting of the custom parameter, the PLC program must do some math using this parameter. Depending on the PLC programming language used, the required function to use on the parameter can vary from an arithmetic statement in Structured Text (ST), or using a *Function Block* in Ladder Diagram (LD) logic.

Below are screenshots of an example project using Menu 30 to display a pressure value with respect to the max pressure (%) in a simple pump application using Structured Text. The highlighted sections show the lines that update Menu 30 on the keypad display.



The image contains three main screenshots illustrating the configuration of a custom parameter for Menu 30:

- Top Screenshot: Parameter Definition**
 - Name:** PressureGauge
 - Storage Type:** Volatile
 - Data Type:** INT
 - Units:** %
 - Decimal Places:** 2
 - Minimum Value:** 327.00
 - Maximum Value:** 327.00
 - Keypad Read Only:** Checked
 - Caption:** Pressure Percentage
 - Tooltip:** The percentage of pressure applied.
- Bottom Left Screenshot: Structured Text (ST) Code**

```

1 PROGRAM Freewheeling
2 VAR
3   PumpFreq: LREAL;
4   PumpPres: LREAL;
5   MotorFreq: LREAL;
6 END_VAR
7
8 IF M07.P001>40 AND M07.P001<60 THEN
9   PumpFreq:=16.67;
10  MotorFreq:= M05.P001;
11  PumpPres:=(MotorFreq/60)*100;
12  M01.P021:=PumpFreq;
13  M30.PressureGauge:=PumpPres;
14 END_IF
15
16 IF M07.P001<40 THEN
17   PumpFreq:=33.33;
18   MotorFreq:= M05.P001;
19   PumpPres:=(MotorFreq/60)*100;
20   M01.P021:=PumpFreq;
21   M30.PressureGauge:=PumpPres;
22 END_IF
23
24 IF M07.P001>60 THEN
25   PumpFreq:=3.33;
26   MotorFreq:= M05.P001;
27   PumpPres:=(MotorFreq/60)*100;
28   M01.P021:=PumpFreq;
29   M30.PressureGauge:=PumpPres;
30 END_IF

```
- Bottom Right Screenshot: Keypad Display**
 - Update to Menu 30:** Shows the keypad displaying "30.001".
 - Set both 11.018 and 11.019 to 30.001 to display on keypad. Save Parameters.** Shows the keypad displaying "30.001".
 - Custom parameter displayed:** Shows the keypad displaying "57.28 %".

Resources: can be found on our website: www.controltechniques.com

For help contact techsupport.cta@mail.nidec.com, or
call Technical Support at 952-995-8000, 24/7/365