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# APPLICATION NOTE

## AC15 Settings for AC10 Users

## Contents

1. Introduction .....	3
2. The AC15 Keypad.....	4
3. Setting the Engineer View .....	5
4. Direct Parameter Settings.....	6
4.1 Setting a Parameter .....	6
4.2 Setting Accel/Decel and Speed Limits.....	7
4.3 Momentary Start/Stop Pushbuttons.....	8
4.4 Automatic Power-On Start.....	9
4.5 Changing the Relay Output Function.....	10
4.6 Remote Start and Local (Keypad) Speed Setpoint.....	12

## 1. Introduction

This application note is intended for users migrating from AC10 products to AC15, who need to set up the AC15 using the onboard keypad, and require a method of setting up the AC15 to match the functionality of an AC10.








The AC15 was designed and developed to be as close as possible to the AC10 that it replaces, however because it's internal software structure is different, some functions of the AC10 are not present in the AC15. However, the AC15 can replicate those functions by configuring different parameter settings.

Common settings that may be required include:

- Quick motor setup: Basic motor parameters, minimum and maximum speeds, and acceleration/deceleration ramp rates.
- Start/Stop switching: Maintained contacts or momentary pushbuttons
- Automatic start on power on.
- Speed Reference settings: Local (keypad) speed reference with remote start/stop pushbuttons
- Setting the function of the relay output

All of these settings are easily made using the DSElite software package, but require additional instruction if they are to be set using the keypad. This application note is intended to guide the user through the process. The application note has been laid out such that each setup is contained within one or two pages that may be easily printed.

## 2. The AC15 Keypad

Keypad Overview	
 <p>The image shows a yellow AC15 Series keypad with a green LCD display showing 'P 1003' and 'SAV %Hz', 'Rx', and 'Tx' indicators. The keypad features a 'Parker' logo and five main buttons: 'M' (Menu), 'E' (Escape), 'I' (Run), and a red 'STOP / RESET' button, along with up and down arrow keys.</p>	
Navigation / Parameter Edit Keys	
	<p><b>MENU Key</b>            Navigation - Displays the next Menu level, or the first parameter of the current Menu.            Parameter - Allows a writable parameter to be modified.</p>
	<p><b>UP Key</b>            Navigation - Moves upwards through the list of parameters.            Parameter - Increments the value of the displayed parameter.</p>
	<p><b>DOWN Key</b>            Navigation - Moves downwards through the list of parameters.            Parameter - Decrements the value of the displayed parameter.</p>
	<p><b>ESCAPE Key</b>            Navigation - Displays the previous level's Menu.            Parameter - Returns to the parameter list.</p>
Local Mode Operating Keys	
	<p><b>RUN Key</b>            Control - Runs the motor at a speed determined by the LOCAL SETPOINT.            Trip Reset - Resets any trips and then runs the motor as above. Only operates when the Inverter is in 'Local' Start/Stop (Seq) mode.</p>
	<p><b>STOP / RESET Key</b>            Control - Stops the motor. Only operates when the Inverter is in 'Local' Sequence mode.            Trip Reset - Resets any trips and clears displayed message if trip is no longer active.            Press and hold for approx. 3 seconds to toggle between 'Local' &amp; 'Remote' modes of operation.            Press simultaneously with 'UP' or 'DOWN' key to change direction when in 'Local' mode.</p>

On power-up, the Keypad defaults into the Operator menu, timing out from the start-up screen. You can skip the timeout by pressing the M key immediately after power-up which will take you directly to the Operator menu.

The menu system is a map which is navigated using four keys. Keys E and M navigate through the menu levels. The UP and DOWN keys scroll through the menu and parameter lists.

Because the Menu and Parameter lists are looped, the UP key can quickly move you to the last Menu or Parameter in the loop.

### 3. Setting the Engineer View

The default view level of the AC15 MMI is Technician. This mode allows for the setup of the AC15 using the keypad menu. However, if the number of the parameter to be changed is known, settings can be made more quickly using the Engineer view.

When in Engineer view (Parameter 0002 - View Level = 2) parameters may be accessed directly by navigating to ENG on the AC15 keypad and entering the required parameter number, followed by the M key. The examples given in this application note will use the Engineer view.

To change the view level to Operator or Engineer, use the sequence of button presses shown below to access and set the view level. Setting Parameter 0002 to 0 sets the Operator view level, 1 sets the Technician View Level and 2 sets the Engineer view level.

Set The AC15 Menu To Engineering View	
	From the home screen showing r1.2.1
	Press the M key.
	Display shows OPeR
	Press the DOWN key
	Display shows SEt
	Press the M key
	Display shows APP
	Press the DOWN key 4 times
	Display shows COnF
	Press the M key
	Display shows p0924
	Press the DOWN key 2 times
	Display shows p0002 – the value we want to change
	Press the M key 2 times
	Display shows a flashing 1
	Press the UP key changes the parameter value
	Display shows a flashing 2, the setting for Engineering mode
	Press the E key 5 times to save the setting and exit the menu
	Home screen shows r1.2.1. We are now in Engineering mode.

It is advised to set the view level back to technician or operator once the required drive settings have been made. This can be done by following the same process as enabling the Engineering View, but this time setting parameter 0002 to 0 for Operator view level or 1 for Technician view.

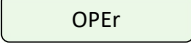




Once in Engineering view, follow the sequence below to access the direct parameter setting screen.

## 4. Direct Parameter Settings

When in Engineer view (Parameter 0002 - View Level = 2) parameters may be accessed directly by navigating to ENG on the AC15 keypad and entering the required parameter number, followed by the M key. The examples given in this application note will use the Engineer view.

### 4.1 Setting a Parameter

In this example, parameter 1797 (Minimum Speed) will be set to 10% by entering the parameter number 1797 directly into the Direct Parameter menu, then entering the required value, before exiting and automatically saving the new setting. The same process is used to set any parameter in the AC15.

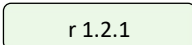

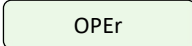


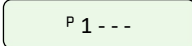


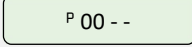

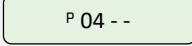
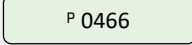


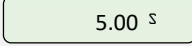

Access The Direct Parameter Setting Mode – Engineering View Enabled	
	From the home screen showing r1.2.1
	Press the M key.
	Display shows OPEr
	Press the UP key
	Display shows EnG
	Press the M key
	Display shows p1 - - - This is the Direct Parameter view
	Press the M key
	Display allows setting of second digit
	Press UP key to enter second digit of required parameter number. e.g. p1797
Repeat	Repeat these steps until all four digits of the required parameter are entered
	Display shows p1797
	Press the M key
	Display shows current setting of 'Min Speed' parameter p1797
	Press the M key
	Press the M key again to move the cursor one position to the left, if required
	Press UP/DOWN keys to set desired value for 'Min Speed'
	Display shows setting
	Press E key twice to save the value and exit to the Direct Parameter View
	OR press E five times to exit to the home screen

## 4.2 Setting Accel/Decel and Speed Limits

Some commonly used settings in an AC10/AC15 are maximum speed clamp, minimum speed clamp, acceleration rate and deceleration rate.

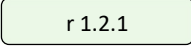

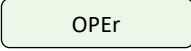

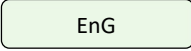

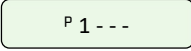


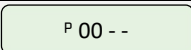

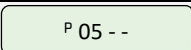
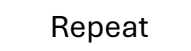






Parameter Setting	Parameter to Change	Expected Input
Maximum speed	0453	0% to 110%
Minimum speed	1797	-100% to 100%
Acceleration rate	0466	0s to 3000s
Deceleration rate	0467	0s to 3000s

The example below shows how to change the acceleration rate (ramp up time) parameter p0466.

Setting Accel/Decel and Speed Limits – Engineering View Enabled	
	From the home screen showing r1.2.1
	Press the M key
	Display shows OPEr
	Press the UP key
	Display shows EnG
	Press the M key
	Display shows p1 - - - or p0 - - - This is the Direct Parameter view
	Press the DOWN key to enter first digit of required number. e.g. p0466
	Press the M key
	Display allows setting of second digit
	Press UP key to enter second digit of required parameter number. e.g. p0466
	Display shows setting of second digit
Repeat	Repeat these steps until all four digits of the required parameter are entered
	Display shows p0466
	Press the M key
	Display shows current setting of 'Accel Time' parameter p0466
	Press the M key
	Press the M key again to move the cursor one position to the left, if required
	Press UP/DOWN keys to set desired value for 'Accel Time'
	Display shows setting
	Press E key 2 times to save the value and exit to the Direct Parameter view

### 4.3 Momentary Start/Stop Pushbuttons

The default setting for AC15 is for the run signal to be maintained. i.e. The run signal is intended to be a switch between 24V and digital input 1. If separate start/stop pushbuttons are to be used, the AC15 must be set to 'latch' the run command when the start is pushed and reset when the stop button wired to digital input 4 is pushed. To do this, we simply change the 'sign' of digital input 4 (p0588), so that it works with a normally closed stop pushbutton.

Setting Momentary Start/Stop Pushbuttons – Engineering View Enabled	
	From the home screen showing r1.2.1
	Press the M key
	Display shows OPEr
	Press the UP key
	Display shows EnG
	Press the M key
	Display shows p1 - - - or p0 - - - This is the Direct Parameter view
	Press the DOWN key to enter first digit of required number. e.g. p0588
	Press the M key
	Display allows setting of second digit
	Press UP key to enter second digit of required parameter number. e.g. p0588
	Display shows setting of second digit
Repeat	Repeat these steps until all four digits of the required parameter are entered
	Display shows p0588
	Press the M key
	Display shows current setting of 'digital input 4 sign' parameter p0588
	Press the M key. The display will flash.
	Press UP key to set parameter p0588 to 1 (invert digital input 4)
	Display shows setting
	Press E key 2 times to save the value and exit to the Direct Parameter view

## 4.4 Automatic Power-On Start

The default setting for AC15 is for the run command connected to digital input 1 to change from off to on before the drive will start. If power is applied with digital input 1 already switched on, the drive will not start.

This behavior can be changed so that on power up, the drive will go directly to run mode if in 'remote mode' and a run input signal is present on digital input 1.

To set the AC15 to automatically start - we change the setting of 'Power Up Start' (p0500) to 'true'

Setting 'Power Up Start' – Engineering View Enabled	
	From the home screen showing r1.2.1
	Press the M key
	Display shows OPEr
	Press the UP key
	Display shows EnG
	Press the M key
	Display shows p1 - - - or p0 - - - This is the Direct Parameter view
	Press the DOWN key to enter first digit of required number. e.g. p0500
	Press the M key
	Display allows setting of second digit
	Press UP key to enter second digit of required parameter number. e.g. p0588
	Display shows setting of second digit
Repeat	Repeat these steps until all four digits of the required parameter are entered
	Display shows p0500
	Press the M key
	Display shows current setting of parameter 0500 (default is zero)
	Press the M key
	Flashing display allows setting of parameter 0500
	Press UP key to change the value to 1 (Power Up Start = True)
	Display shows new setting of parameter 0500
	Press E key 2 times to save the value and exit to the Direct Parameter view

## 4.5 Changing the Relay Output Function

The default setting for AC15 is for the relay output to indicate 'healthy'. The AC10 has several settings for the relay output. Most used are: Tripped, At Speed, Stopped (zero speed) and Ready. These settings can be made in the AC15 by changing the 'source' of the internal software link (p1258) connected to the relay output function. It may also be necessary to invert the relay function (p0623).

Relay Function	Parameter p1258 Setting	Parameter p0623 Setting
Tripped	0508 (Tripped)	0
At Speed	0478 (Ramping Active)	1 (Inverted)
Stopped	0509 (Running)	1 (Inverted)
Ready	0515 (Ready)	0

Any parameter that is digital (i.e. has a value range of 0/1) can be connected to the relay output. Please refer to the AC15 software manual for a full list of all parameter numbers.

Invert The Relay Output Function – Engineering View Enabled	
	From the Engineering View
	Press the M key, to select the second digit.
	Display allows setting of second digit
	Press UP key to enter second digit of required parameter number 0623
	Display shows setting of first digit
	Press the M key, to select the third digit.
	Press UP key to enter third digit of required parameter number 0623
	Display shows setting of third digit
	Press the M key to enter final digit of required parameter number 0623
	Press UP key to enter final digit of required parameter number 0623
	Display shows setting of final digit
	Press the M key
	Display shows current setting of parameter 0623 (default is zero)
	Press the M key
	Display allows setting of parameter 0623
	Press UP key to change the value to 1 (Invert Output = True)
	Display shows new setting of parameter 0623
	Press E key 2 times to save the value and exit to the Direct Parameter view

Setting The Relay Output Function (Link 7 source) – Engineering View Enabled	
	From the home screen showing r1.2.1
	Press the M key
	Display shows OPEr
	Press the UP key
	Display shows EnG
	Press the M key
	Display shows p1 - - - or p0 - - - This is the Direct Parameter view
	Press UP key to enter first digit of required parameter number p1258
	Display shows setting of first digit
	Press the M key
	Display allows setting of second digit
Repeat	Repeat these steps until all four digits of the required parameter are entered
	Display shows p1258
	Press the M key
	Display shows current setting of parameter 1258 (default is 601)
	Press the M key
	Display allows setting of last digit
	Press the M key twice
	Display allows setting of first digit
	Press the DOWN key to set digit to 5
	Display shows setting as 508
WAIT	The cursor will move back to the first digit automatically
	Display allows setting of last digit
	Press the UP key until the last digits shows 8
	Display allows setting of last digit as 8
	Press the M key
	Display shows setting for Link 7 source as p508 (Tripped)
	Press E key 2 times to save the value and exit to the Direct Parameter view

## 4.6 Remote Start and Local (Keypad) Speed Setpoint

Some applications require the fitting of remote start/stop buttons but use the keypad of the drive to set the speed. The AC15 does not have this mode of operation as a selection, but it can be implemented using the AC15's custom menu feature. To do this, we need to promote 'Local Setpoint' to the operator menu, and move an internal link, so that 'Local Setpoint' is used by the drive even in remote mode, when external start/stop buttons are used.

Move Local (Keypad) Speed Setpoint to the Operator Menu – Engineering View Enabled	
	From the home screen showing r1.2.1
	Press the M key
	Display shows OPeR
	Press the UP key
	Display shows EnG
	Press the M key
	Display shows p1 - - - or p0 - - - This is the Direct Parameter view
	Press the DOWN key to enter first digit of required number. e.g. p0931
	Press the M key
	Display allows setting of second digit
	Press UP key to enter second digit of required parameter number. e.g. p0931
	Display shows setting of second digit
Repeat	Press the M key
	Display shows p0931
	Press the M key
	Display shows current setting of 'Operator Menu 1' parameter p0931
	Press the M key
	Press the M key again to move the cursor one position to the left, if required
	Press UP/DOWN keys to set 0459 for 'Operator Menu 1'
	Display shows setting
	Press E key 2 times to save the value and exit to the Direct Parameter view

Next, we change the source of internal link 10 so that the Local Setpoint parameter is used by the AC15 for speed setpoint, and the analogue inputs are disconnected.

Connect Local (keypad) Speed Setpoint – Engineering View Enabled	
	From the Direct Parameter view
	Press the UP key to enter first digit of required number. e.g. p1264
	Press the M key
	Display allows setting of second digit
	Press UP key to enter second digit of required parameter number. e.g. p1264
	Display shows setting of second digit
Repeat	Repeat these steps until all four digits of the required parameter are entered
	Display shows p1264
	Press the M key
	Display shows current setting of parameter p1264 (default is 2064)
	Press the M key
	Flashing display allows setting of parameter p1264
	Press the M key three times, to select the first digit.
	Flashing display allows setting of parameter p1264
	Press the DOWN key to set the first digit of setting 459
WAIT	The cursor will move back to the next digit automatically
	Press the DOWN key to set the second digit of setting 459
Repeat	Repeat these steps until the required value 459 is entered
	Flashing display shows new setting of parameter p1264 = 459
	Press E key 2 times to save the value and exit to the Direct Parameter view
	OR press E five times to exit to the home screen

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