EMERSON
Industrial Automation

This Application Note is pertinent to our Unidrive SP, Mentor/Quantum MP
and Affinity Drive Families

Backing Up Critical Drive Setup Info
Using the Smart Card

Modern drives such as the Unidrive SP, Mentor/Quantum MP and Affinity contain in excess of 500 parameters permitting applications ranging from very simple to quite complex to be accomplished through basic parameter adjustments and selection settings.   More complex applications may use in addition, a ladder logic program executed by the drives built-in PLC capability.   To perform with optimum response characteristics, certain critical motor data and tuning information was derived during original commissioning.

Regardless of the complexity, this setup data defines the essence of the application and allows the drive to perform as it was intended for that application.   Should it become necessary to replace a drive, without this critical data, the drive would be unable to perform as it was originally intended.

Control Techniques will be able to provide you with a replacement drive but we will not have the "*recipe*" (data) that was specific for your application.   Therefore, **it is imperative** that the OEM, System Integrator, Field Engineer or Installer back up this critical information and leave a copy with the End User following the commissioning process. Failure to do so often results in unnecessary and costly machine downtime and End User customer frustration.

This application note will cover using the Smart Card method of "backing up" drive setup data and internal PLC program if applicable.

Consult **CTAN353** for
Back Up Drive Parameter using CTSoft

Smart Card Method

SmartCard

Regardless whether your intention is to back up the drive data using CTSoft (our PC software), **one should always utilize the SMART CARD** to provide another level of drive data backup. Control Techniques provides a Smart Card with each drive. The Smart Card provides a convenient, quick, simple method of capturing and restoring drive data. Unfortunately it is our experience that very few End Users are aware of this Smart Card or unable to find it during critical times or if they do find it, it is often unlabelled and blank.

The OEM, System Integrator, Field Engineer or Installer should instruct the End User customer on how to restore drive data from the Smart Card should it become necessary.

Saving Drive Data to the Smart Card
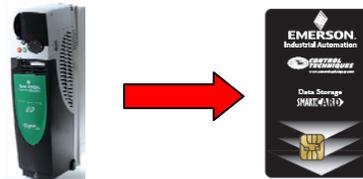
Saving the Drive data to the Smart Card is very simple. So simple that it becomes tragic should drive replacement become necessary and the customer does not have a Smart Card or the data has not been stored on it following commissioning !

On the Undrive SP the Smart Card is to be inserted as shown below into a receiving slot under/behind the drives keypad/display. **The Smart Card and Keypad/Display can be inserted or removed with power on.** It is not necessary to remove drive power when inserting or removing the Smart Card and/or Keypad/Display.

Push in both right & left buttons to release the keypad.
If the drive is running under Keypad control, the drive
will trip when the keypad is removed.

For UniSP Size 0, the gold square faces the left when inserting !!!!

If the drive is running under Keypad control, the
drive will trip when the keypad is removed.
For this reason, it is best that the drive not be
running when removing the Keypad/Display unit.

Saving Drive Data to the Smart Card- con't

The Smart Card offers a number of special features that allows storage of multiple drive parameters sets, comparing parameters sets etc. This application note will merely cover the basic simplest method of storing a single drive parameter set.

One can refer to the rear of the Smart Card for a quick summary. As the Smart Card outlines- parameter #0.30 (located in menu 0) governs basic Smart Card operations.

To perform a simple STORE of drive parameters, one would go to parameter #0.30 and set it to $Pro9$ then depress the red Reset button. (It is best that the drive not be running at this time). After a short delay of about 1 second the display will revert to $nonE$ which will confirm that the data has been written to the Smart Card.

To see a short video of this procedure click → **CTVI106**

Then **label the card** with something meaningful which will indicate:
1) Data is indeed on the Card
2) What drive section that data is for
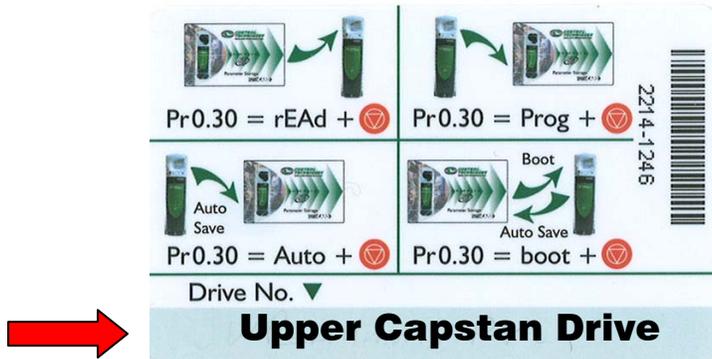
Saving a PLC Program to the Smart Card

On occasion a small Ladder program may be written to extend the application of the standard drive and this program will be downloaded and executed into the PLC memory area within the drive.   If this is the case, performing the simple Save (using parameter #0.30 as previously discussed) **WILL NOT** save the PLC Ladder program to the Smart Card.

Saving a copy of the PLC Ladder will require a separate slightly more complex method.

(It is best that the drive not be running at this time).
If the drive is running under Keypad control, the drive will Stop when the red button is depressed.

Go to parameter #0.00

Enter in 5002

then press the Red Reset/Stop   **button.**

If you are not sure whether there is a PLC Ladder inside or not, it will not do any harm to perform this step.   If there is no PLC program inside the drive, a null program will be stored on the Smart Card.

It should be noted that most all Affinity drives do not contain PLC programs.

Restoring Drive Data from Smart Card to Drive

Should it become necessary to replace a drive or if you wish to duplicate the function of a particular drive by creating an identical duplicate, a Smart Card is an ideal tool.

Assuming the Smart Card contains known good drive data…..

One can refer to the rear of the Smart Card for a quick summary. As the Smart Card outlines- parameter #0.30 (located in menu 0) governs basic Smart Card operations.

The drive should not be running during parameter restoration. We would suggest that you keep the drive inhibited during the restoration process.
Remove any wires to terminal 31 and the drive should indicate *inh* - inhibited.

To perform a simple READ of drive parameters, one would go to parameter #0.30 and set it to *rEAd* then depress the red Reset button.   After a short delay of about 1 second the display will revert to *nonE* which will confirm that the data has been transferred from the Smart Card to the drive.
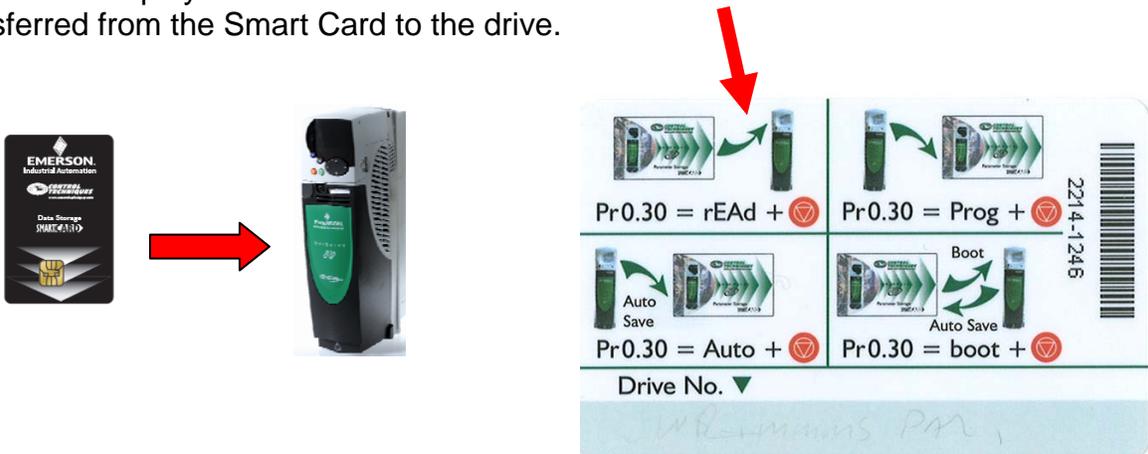
To see a short video of this procedure click →   **CTVI107**

Restoring a PLC Program from Smart Card to Drive
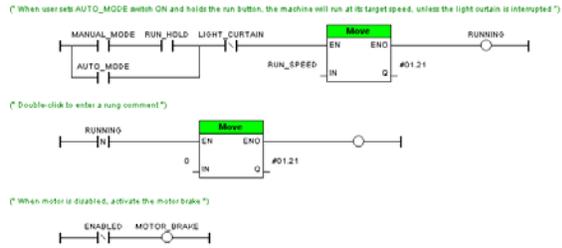
On occasion a small Ladder program may be written to extend the application of the standard drive and this program will be downloaded and executed into the PLC memory area within the drive. If this is the case, performing the simple Read (using parameter #0.30 as previously discussed) **WILL NOT** restore the PLC Ladder program if one existed in the original drive.

Transferring a saved copy of the PLC Ladder will require a separate slightly more complex method.

The drive should not be running during parameter restoration. We would suggest that you keep the drive inhibited during the restoration process.

Remove any wires to terminal 31 and the drive should indicate *inH* - inhibited.

> ### Go to parameter #0.00
>
> ### Enter in 6002
>
> ### then press the Red Reset/Stop   button.

If you are not sure whether there was a PLC Ladder inside or not, it will not do any harm to perform this step.   If there is no PLC program inside the drive, a null program will be written.

It should be noted that most all Affinity drives do not contain PLC programs.

For more information on the Smart Card advanced features, consult the
User's Guide Section 9

Questions ??   Ask the Author:

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               (716)-774-1193
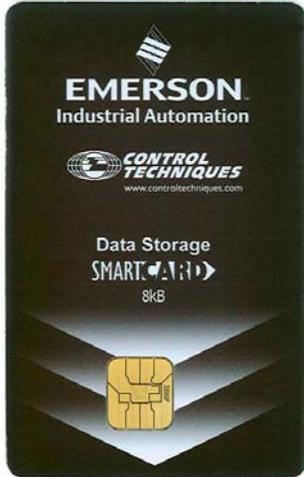
Smart Cards

Unidrive SP

Original Unidrive SP Smart Card – superseded by black card shown left

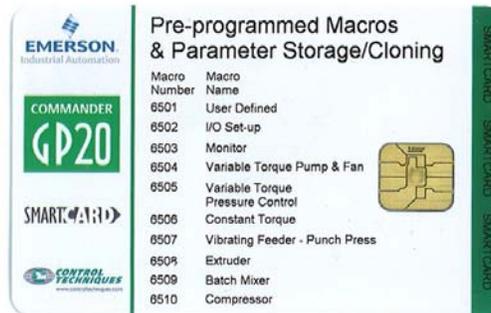
PN 2214-4246

PN 2214-1246

Affinity
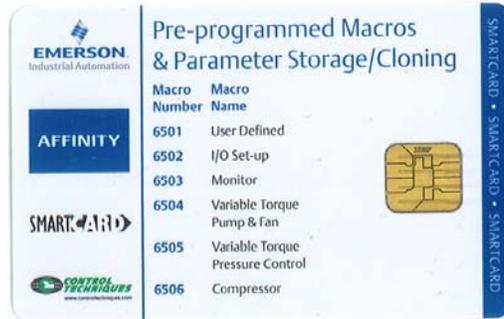
PN 2214-3246

GP20

PN 2214-2246

Smart Card Error Messages

Trip	Diagnosis
C.Acc	**SMARTCARD trip: SMARTCARD Read / Write fail**
185	Check SMARTCARD is installed / located correctly Ensure SMARTCARD is not writing data to data location 500 to 999 Replace SMARTCARD
C.boot	**SMARTCARD trip: The menu 0 parameter modification cannot be saved to the SMARTCARD because the necessary file has not been created on the SMARTCARD**
177	A write to a menu 0 parameter has been initiated via the keypad with Pr **11.42** set to auto(3) or boot(4), but the necessary file on the SMARTCARD has not been created Ensure that Pr **11.42** is correctly set and reset the drive to create the necessary file on the SMARTCARD Re-attempt the parameter write to the menu 0 parameter
C.bUSY	**SMARTCARD trip: SMARTCARD can not perform the required function as it is being accessed by a Solutions Module**
178	Wait for the Solutions Module to finish accessing the SMARTCARD and then re-attempt the required function
C.Chg	**SMARTCARD trip: Data location already contains data**
179	Erase data in data location Write data to an alternative data location
C.Cpr	**SMARTCARD trip: The values stored in the drive and the values in the data block on the SMARTCARD are different**
188	Press the red ⊚ reset button
C.dat	**SMARTCARD trip: Data location specified does not contain any data**
183	Ensure data block number is correct
C.Err	**SMARTCARD trip: SMARTCARD data is corrupted**
182	Ensure the card is located correctly Erase data and retry Replace SMARTCARD
C.Full	**SMARTCARD trip: SMARTCARD full**
184	Delete a data block or use a different SMARTCARD
C.Optn	**SMARTCARD trip: Solutions Modules installed are different between source drive and destination drive**
180	Ensure correct Solutions Modules are installed Ensure Solutions Modules are in the same Solutions Module slot Press the red ⊚ reset button
C.Prod	**SMARTCARD trip: The data blocks on the SMARTCARD are not compatible with this product**
175	Erase all data on the SMARTCARD by setting Pr **xx.00** to 9999 and pressing the red ⊚ reset button Replace SMARTCARD
C.rdo	**SMARTCARD trip: SMARTCARD has the Read only bit set**
181	Enter 9777 in Pr **xx.00** to allow SMARTCARD Read / Write access Ensure the drive is not writing to data locations 500 to 999 on the card

Trip	Diagnosis
C.rtg	**SMARTCARD trip: The voltage and/or current rating of the source and destination drives are different**
186	Drive rating dependent parameters (parameters with the RA coding) are likely to have different values and ranges with drives of different voltage and current ratings. Parameters with this attribute will not be transferred to the destination drive by SMARTCARDs when the rating of the destination drive is different from the source drive and the file is a parameter file. However, with software V01.09.00 and later drive rating dependent parameters will be transferred if only the current rating is different and the file is a differences from default type file. Press the red ⊚ reset button Drive rating parameters are: _table below_
C.Typ	**SMARTCARD trip: SMARTCARD parameter set not compatible with drive**
187	Press the red ⊚ reset button Ensure destination drive type is the same as the source parameter file drive type

Parameter	Function
2.08	Standard ramp voltage
4.05/6/7, 21.27/8/9	Current limits
4.24	User current maximum scaling
5.07, 21.07	Motor rated current
5.09, 21.09	Motor rated voltage
5.10, 21.10	Rated power factor
5.17, 21.12	Stator resistance
5.18	Switching frequency
5.23, 21.13	Voltage offset
5.24, 21.14	Transient inductance
5.25, 21.24	Stator inductance
6.06	DC injection braking current
6.48	Line power supply loss ride through detection level

The above parameters will be set to their default values.