



M Y N A HSM

**UniPulse F805-CF Weighing Controller
Programmable Serial Interface Card
Series 2**

USER MANUAL

IOD-1177, Rev. P1.11

November 29, 2007

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1 Introduction

1.1 Scope

This document is User Manual for IOD-1177, the UniPulse F805-CF communications driver firmware for the Emerson Process Management (EPM) DeltaV Control System. The driver runs in the DeltaV Series 2 Programmable Serial Interface Card (PSIC). The reader should be familiar with EPM's DeltaV PSIC and connected UniPulse F805-CF devices.

1.2 Document Format

This document is organized as follows:

Introduction	Describes the scope and purpose of this document.
Theory of Operation	Provides a general functional overview of the UniPulse F805-CF Driver.
Downloading Firmware	Describes downloading procedures for the driver firmware on to the DeltaV PSIC.
Configuration Information	Describes procedures and guidelines for configuring the DeltaV PSIC.
Operational Check	Provides tips and assistance to ensure PSIC is properly setup and configured.
DeltaV–Field Device Electrical Interface	Describes the electrical interface between DeltaV and the UniPulse F805-CF devices. Also describes the cable pin assignments for RS-232 and RS-485.
Technical Support	Describes who to call if you need assistance.



1.3 System Specifications

The following table lists the minimum system requirements for the driver:

Protocol Compatibility and Reference documents	The communication protocol used is the UniPulse F805-CF Communication Protocol described in the UniPulse F805-CF manual.
Software Requirements	DeltaV System Software (Release 6.3.2 or later) installed on a hardware-appropriate Windows workstation configured as a ProfessionalPlus for DeltaV Serial Interface Port License (VE4102)
Minimum DeltaV Hardware Requirements	FRSI DeltaV Serial Interface Series 2, Hardware PN: 12P2506X022 FRSI DeltaV M3, M5, MD or Series 2 MD Controller, Power Supply and 2 wide controller carrier FRSI 8 wide I/O card carrier

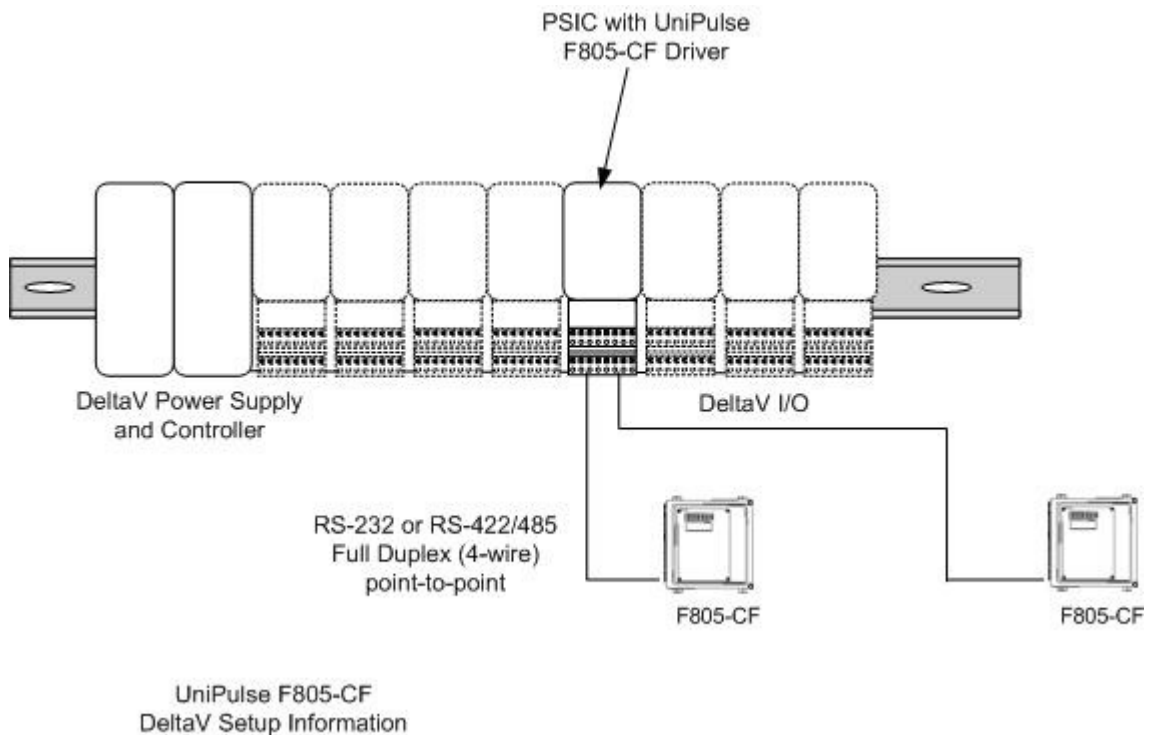


2 Theory of Operation

The Programmable Serial Interface Card (PSIC) has 2 ports which can be configured for RS-232, RS-422/RS-485 Half Duplex or RS-422/RS-485 Full Duplex communications with external devices.

For communications with UniPulse F805-CF devices, the PSIC connects to the RS-232 port of the UniPulse F805-CF. Optionally, the PSIC can also connect to an RS-422 Full-Duplex port on the UniPulse F805-CF in point-to-point communications mode only. Consequently, only one UniPulse F805-CF device can be connected to each PSIC port, as illustrated below.

The driver runs in Master mode only. Each device uses up to thirteen datasets. Users may choose to configure the datasets in any order. For example, run-time weighing and flow data may be placed in dataset 1. Status information, alarm flags, operation mode, and target set may be in dataset 2. F805-CF configuration parameters may be placed in dataset 3 through dataset 12. The driver only depends on the device data type of the dataset, not the order of the datasets, to determine the use of a dataset.



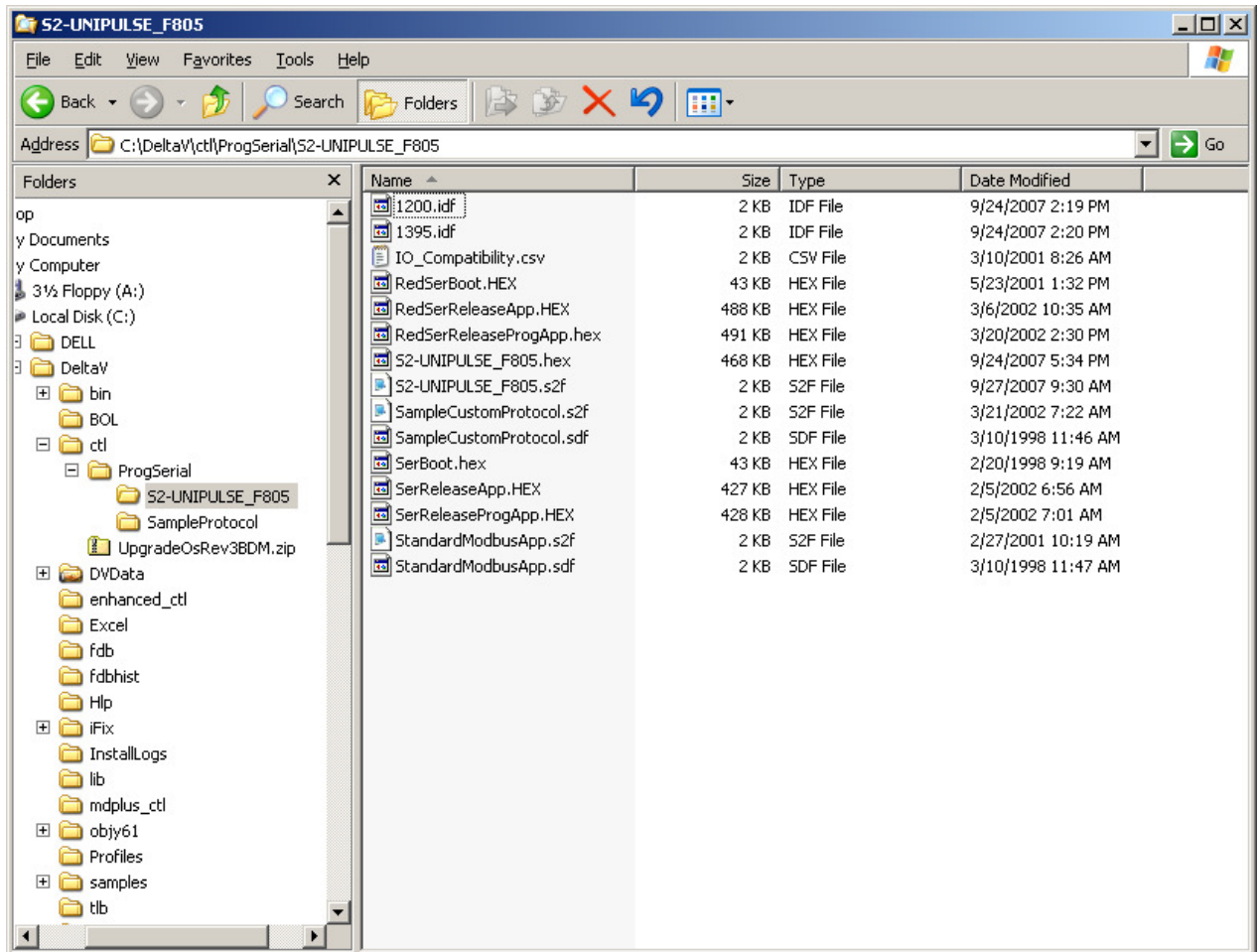


3 Downloading the firmware

The driver software distribution comprises 15 files, distributed on a CD. These files must be copied to the DeltaV directory on your ProPlus Workstation. The path is:

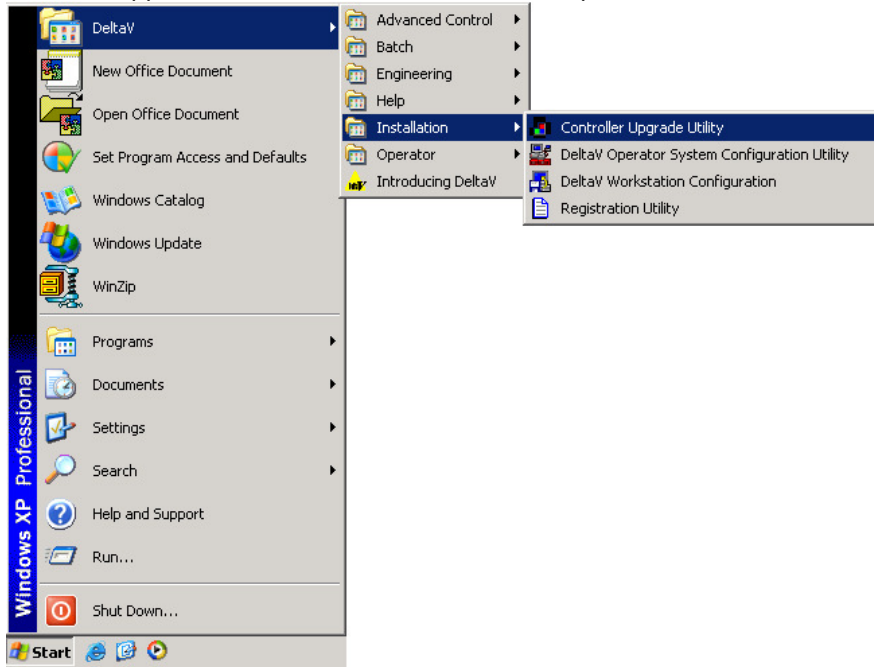
\DeltaV\ctl\ProgSerial\S2-UNIPULSE_F805

Note that you will have to create the \S2-UNIPULSE_F805 subdirectory. The following files will be copied:

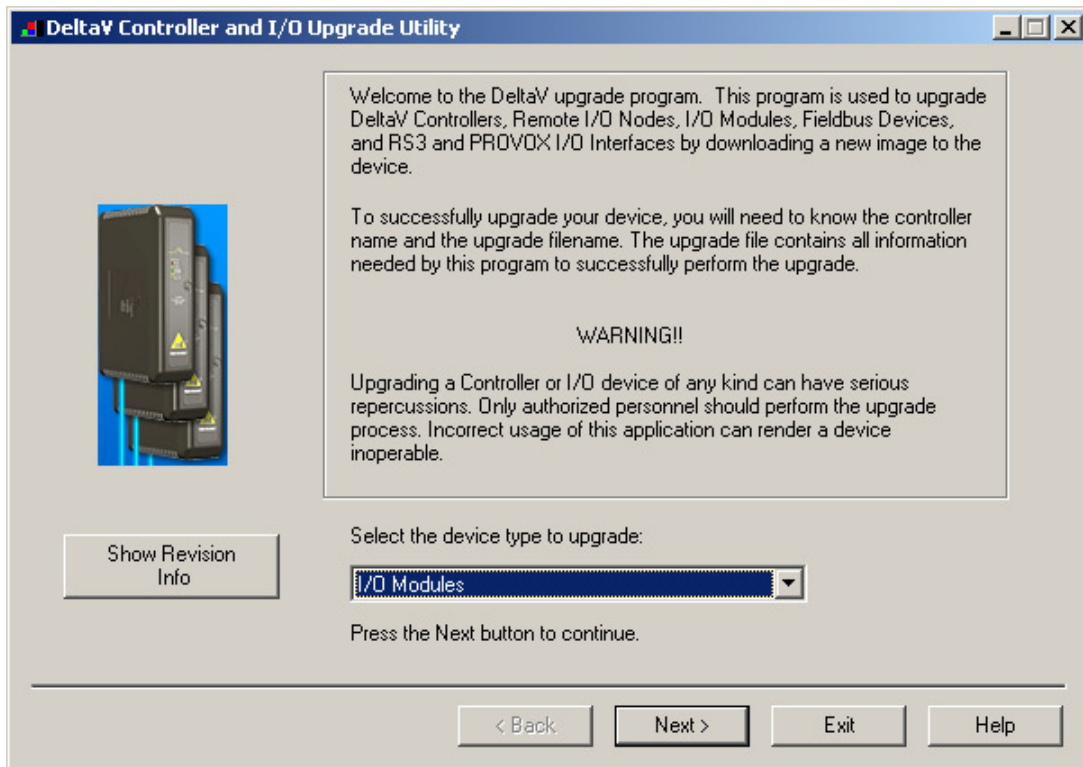




After copy completion, you are ready to program (or upgrade) the Programmable Serial Card with the supplied custom driver software. The steps are as follows:

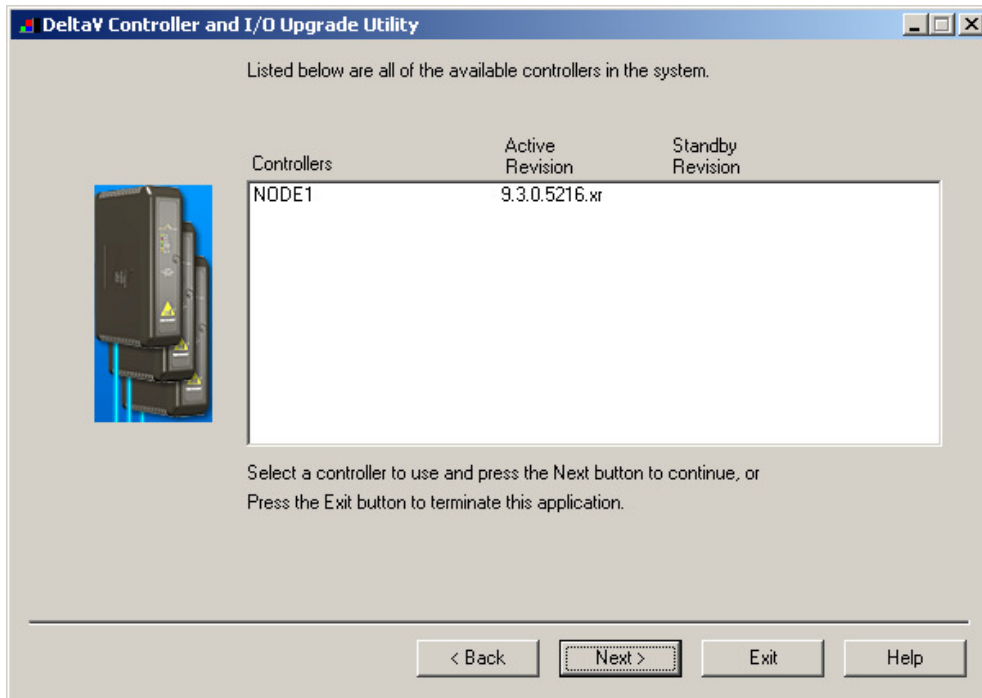


1. Click on the Start button and select DeltaV-> Installation-> Controller Upgrade Utility as shown below, and the following dialog will appear:

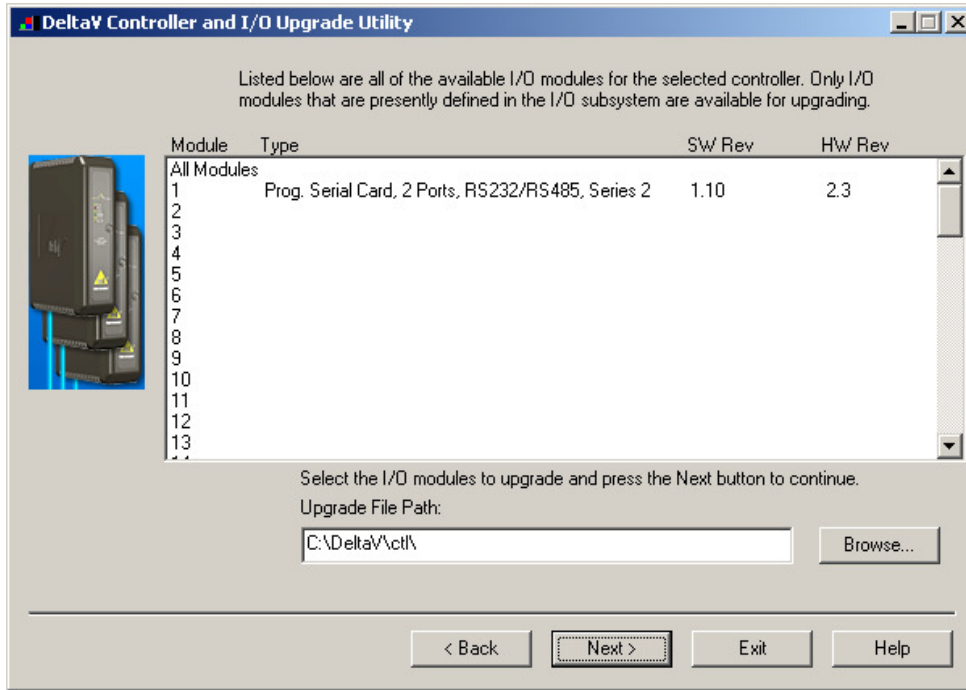




2. Choose "I/O Modules" from the drop down menu and click Next.

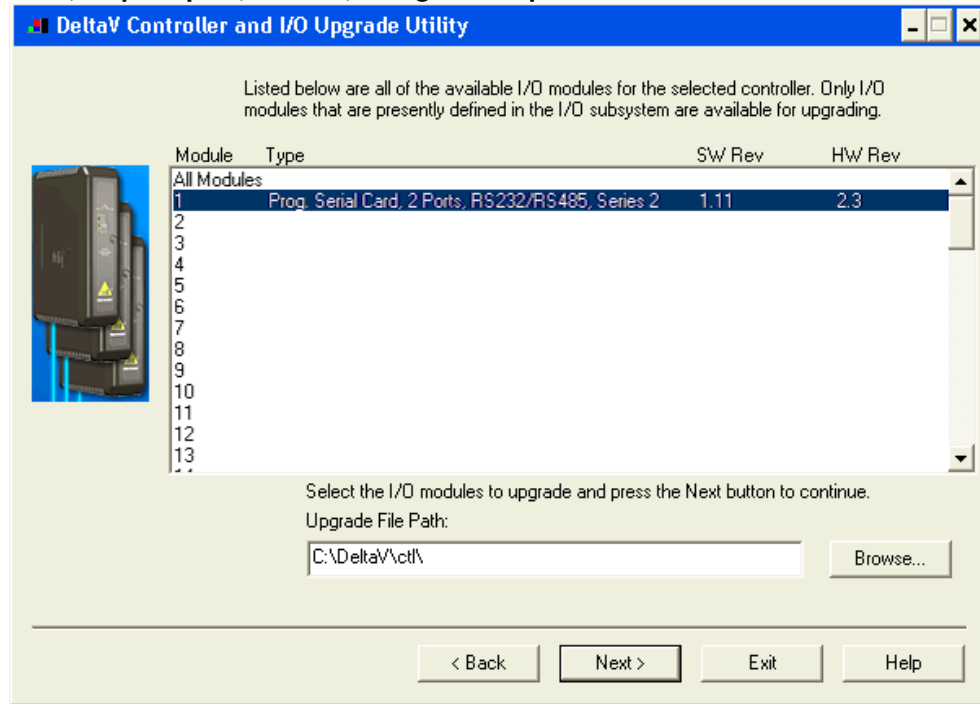


3. The above dialog will appear, listing all the available Controllers in your network. From this dialog, select the appropriate Controller and then Click Next.
4. The following dialog will appear, listing all the I/O modules in your selected Controller. The shown list of I/O modules is an example only. Your list will be different.

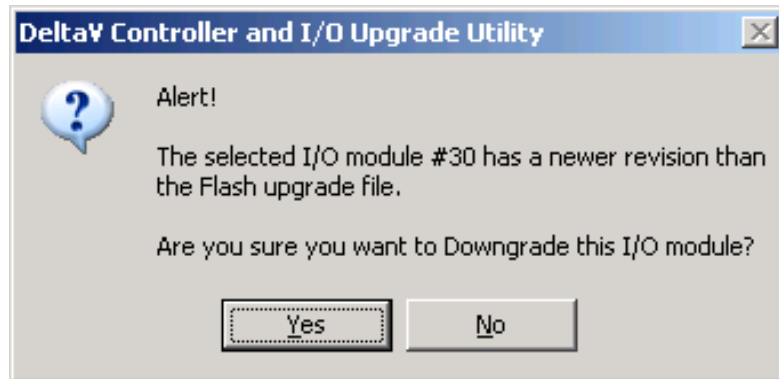




Note: The first time a standard Serial card is upgraded to the Unipulse Driver, the dialog will be as shown below. When upgrading an existing Programmable Serial Card, skip Steps 4, 5 and 6, and go to Step 7.

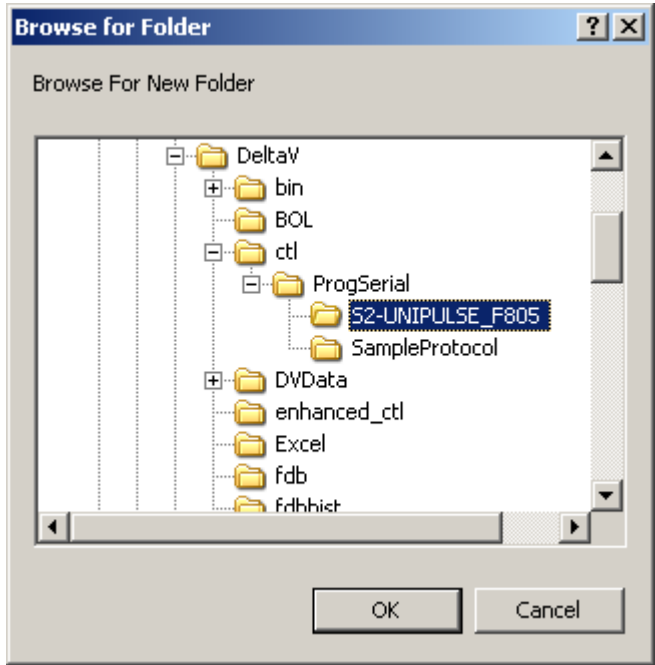


Note: If the serial card has had other serial drivers installed on it, it is possible that this message box will appear. It is ok to downgrade the I/O module, if the correct I/O module has been selected.



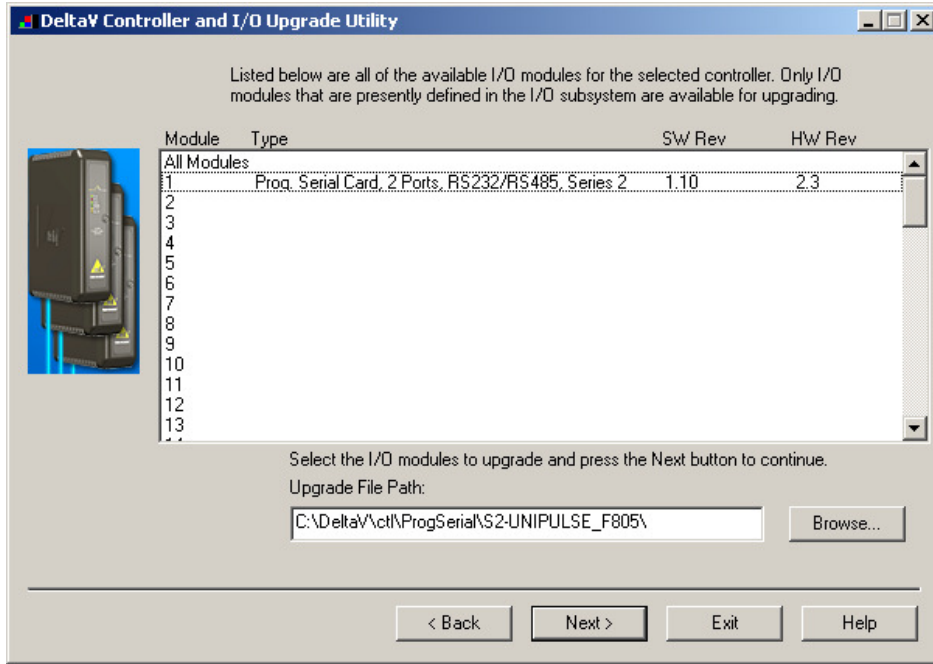


5. Click the Browse button and select the DeltaV path as shown below, and then click Ok. Note that the disk drive could be C or D.

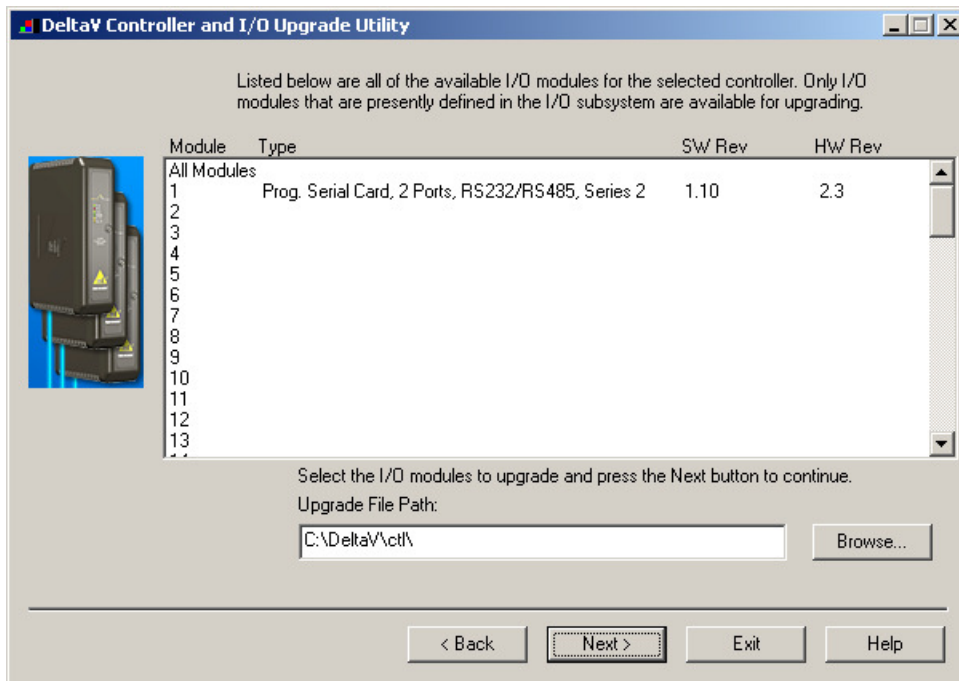




- 6. Select the I/O module again as shown below and then click Next. Go to Step 9.



- 7. If you are upgrading an existing Programmable Serial Card, the dialog will be as shown below. From this dialog, select the Programmable Serial Card I/O Module in the list.



For example, we will select I/O Module 1. This will give you a dialog, from which you will select the file path to where the driver software is located. This path will be:

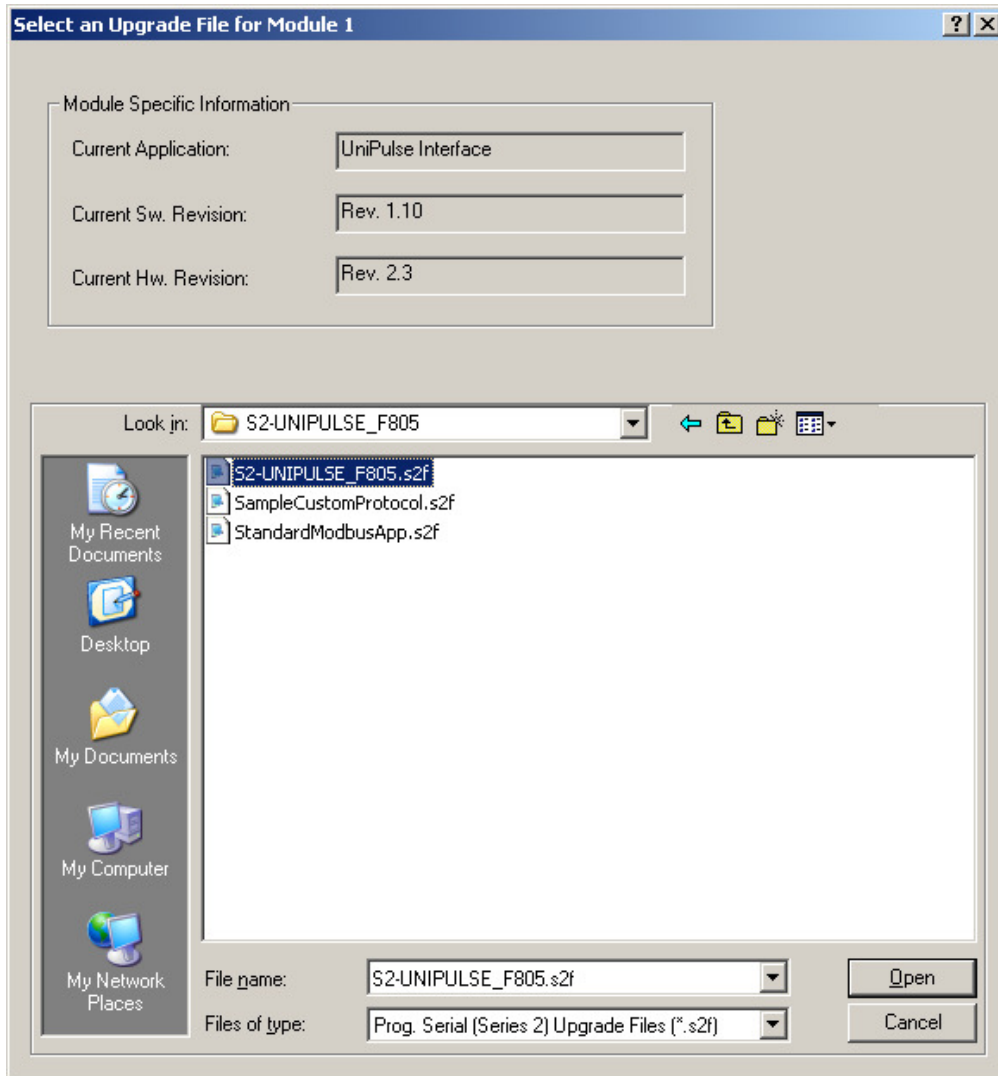


\\Delta\ctl\ProgSerial\S2-UNIPULSE_F805

Once you are in the specified directory, you will need to select the following file:

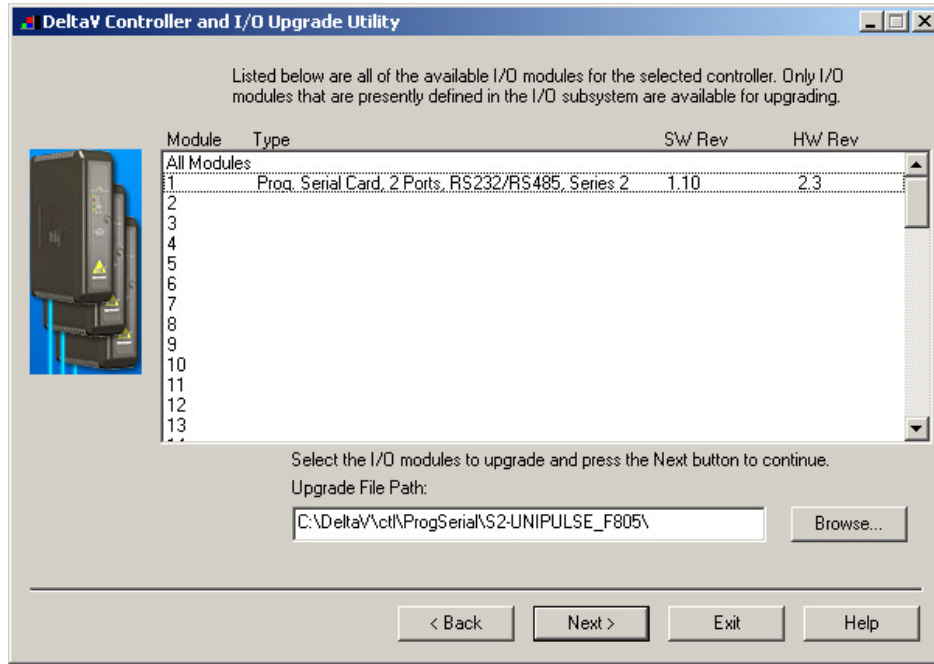
S2-UNIPULSE_F805.S2F

This is shown in the following dialog.

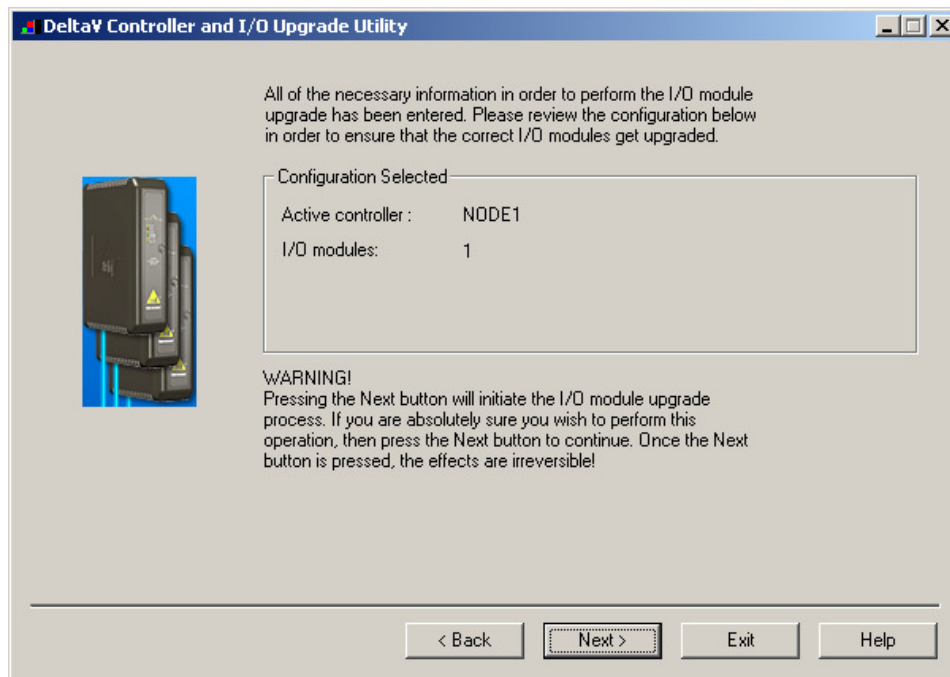




- 8. After selecting the .S2F file, Click on Open. This dialog will close and you will be back to the following:

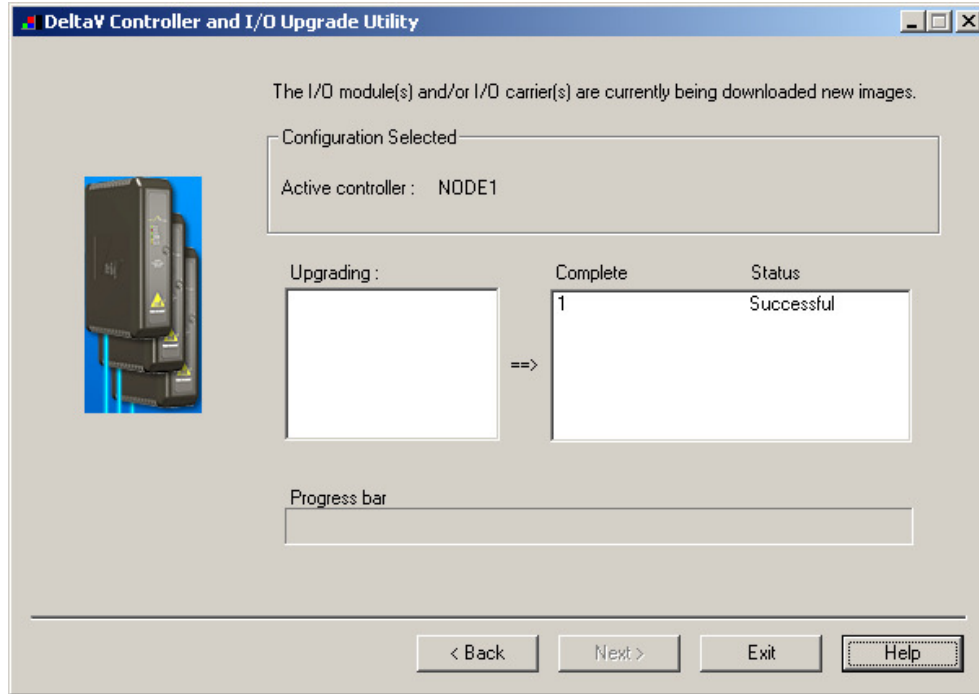


- 9. In this dialog, Click Next again. You will get the following dialog, confirming the Controller and I/O Module to program.





- 10. Click Next and the I/O Module upgrade process will begin. After completion, you will receive the following dialog, indicating success.

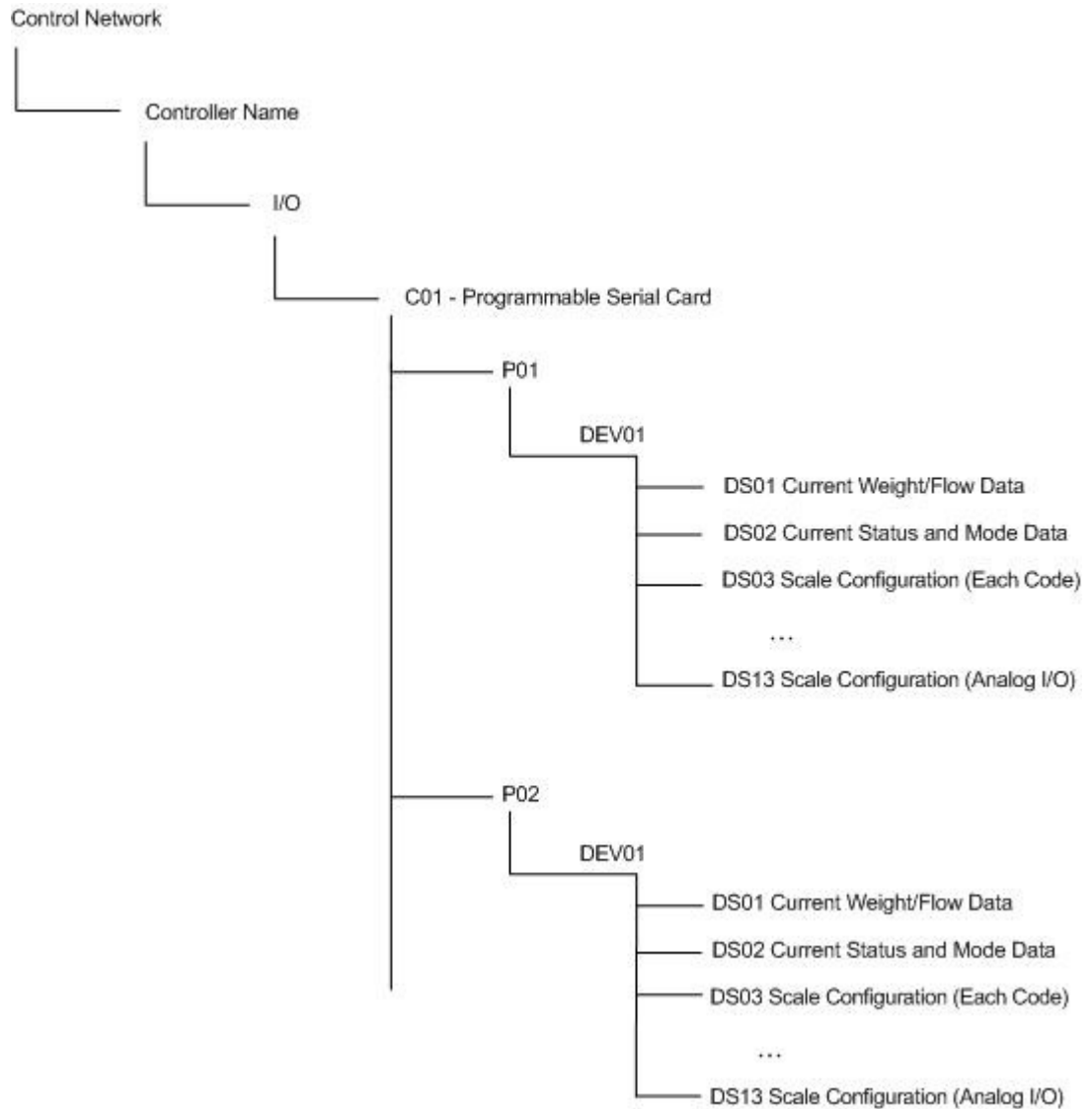


- 11. This completes the I/O Module upgrade process.



4 Configuration Information

One to thirteen datasets must be configured to perform data exchange with a UniPulse F805-CF device. The order of dataset types is user definable, i.e., the driver does not depend on the data set order. The figure below shows an example F805-CF configuration setup:





4.1 Port Configuration

The port should be configured as Master. Transmit delay may be left as the default of 0. The Port Type should be defined as RS-232 or RS-422/RS-485 full duplex. The Baud Rate, Parity, Data Bits and Stop Bits should match the settings of the F805-CF. For RS-422/RS-485 mode, the F805-CF should have its RS-485 ID set to 0 on the device.

The F805-CF also has a parameter to control the message terminator character. The required terminator character is a carriage return (CR). **Note: Do not configure CR+LF as the message terminator.** This must be configured on the F805-CF in the same menu as the other serial port settings.

4.2 Device Configuration

One device should be configured for each F805-CF connected to a given port. The device address is not used in this driver. Only one device may be configured per port (RS-232 or RS422) for a total of two per PSIC.

4.3 Dataset Configuration

There are thirteen (13) datasets configurable for each F805-CF. Two datasets (Device Data Type 0 and 1) contain current weight, flow, and status information for online control of the scale. The other eleven datasets are used to configure the F805-CF. When a Scale Configuration dataset has readback enabled, it is only scanned once at startup. Device Data Type 0 and 1 are the only datasets that are scanned continuously. Some datasets contain registers that are not defined in the table. These undefined registers are not used by the driver and can safely be ignored.

4.3.1 Data Direction

Table 1 lists the possible Device Data Types and their direction. Table 2 matches the Device Data Type with the DeltaV Data Type and gives the size of the dataset.

4.3.2 Data Type and Size

Table 1 – Device Data Types and Descriptions

DEVICE DATA TYPE	DIRECTION	DESCRIPTION
0	Input	Current Weight/Flow Data
1	Output (with Readback)	Current Status and Mode
2	Output (with Readback)	Scale Configuration (Each Code)
3	Output (with Readback)	Scale Configuration (Flow Parameter)
4	Output (with Readback)	Scale Configuration (Comparison)
5	Output (with Readback)	Scale Configuration (Operation)



6	Output (with Readback)	Scale Configuration (Function)
7	Output (with Readback)	Scale Configuration (Control Parameter)
8	Output (with Readback)	Scale Configuration (States Ascertain)
9	Output (with Readback)	Scale Configuration (Auto Coordinate)
10	Output (with Readback)	Scale Configuration (Calibration)
11	Output (with Readback)	Scale Configuration (D/A Converter)
12	Output (with Readback)	Scale Configuration (Analog I/O)

Table 2 – DeltaV Data Types and Dataset Sizes

DEVICE DATA TYPE	DeltaV DATA TYPE	DATA START ADDRESS	NUMBER OF VALUES
0	Floating Point	0	6
1	32-bit UINT	0	24
2	32-bit UINT	0	24
3	32-bit UINT	0	24
4	32-bit UINT	0	24
5	32-bit UINT	0	24
6	32-bit UINT	0	24
7	32-bit UINT	0	24
8	32-bit UINT	0	24
9	32-bit UINT	0	24
10	32-bit UINT	0	24
11	32-bit UINT	0	24
12	32-bit UINT	0	24

4.3.3 Special Data

The Special Data values (1-5) are not used in this driver and can be left as default.



4.3.4 Register Mappings – Input Datasets

There is one input dataset, Current Weight/Flow Data. It contains control information about the active scale. This dataset is continuously scanned.

Table 3 – Current Weight/Flow Data Dataset Register Mapping (Device Data Type 0)

REGISTER	F805-CF Command Used	DESCRIPTION
1	RA	Flow data
2	RB	Net Weight
3	RC	Tare Weight
4	RI	Accumulated Value
5	RJ	Control Rate
6	RK	Control Deviation sign

4.3.5 Register Mappings – Current Status and Mode Dataset

There are eleven output datasets, as shown in Table 1. DeltaV Control Modules must be configured to send commands to the F805-CF. The Current Status and Mode data set (Table 4) will continuously read values from the F805-CF and write any changes made back to the device based on command procedure detailed below. The Scale Configuration datasets (Section 4.3.6) each have set of command registers which is used to update the F805-CF. The procedure for sending commands is given in Section 4.3.7.

Table 4 – Current Status and Mode Dataset Register Mapping (Device Data Type 1)

REGISTER	F805-CF Command Used	DESCRIPTION
1	RD	Status 1 – data is a bit map as follows Bit 0: Lock (soft): 1 – On, 0 – Off Bit 1: Rear Panel Lock: 1 – On, 0 – Off Bit 2: Not Defined Bit 3: Tare Subtracting: 1 – On, 0 – Off Bit 4: Weighing Value Stable: 1 – On, 0 – Off Bit 5-7: Not Defined
2	RE	Status 2 – data is a bit map as follows:



		<p>Bit 0: Flow Rate Under: 1 – On, 0 – Off</p> <p>Bit 1: Flow Rate OK: 1 – On, 0 – Off</p> <p>Bit 2: Flow Rate Over : 1 – On, 0 – Off</p> <p>Bit 3: Control Deviation Under: 1 – On, 0 – Off</p> <p>Bit 4: Control Deviation OK: 1 – On, 0 – Off</p> <p>Bit 5: Control Deviation Over: 1 – On, 0 – Off</p> <p>Bit 6-7: Not Defined</p>
3	RF	<p>Status 3 – data is a bit map as follows:</p> <p>Bit 0: Refilling: 1 = On, 0 = Off</p> <p>Bit 1: Controlling Lock: 1 = On, 0 = Off</p> <p>Bit 2: Alarm: 1 = On, 0 = Off</p> <p>Bit 3: Light Alarm: 1 = On, 0 = Off</p> <p>Bit 4: Upper Limit: 1 = On, 0 = Off</p> <p>Bit 5: Lower Limit: 1 = On, 0 = Off</p> <p>Bit 6: Near Zero: 1 = On, 0 = Off</p> <p>Bit 7: Not Defined</p>
4	RG	<p>Status 4 – data is numeric, with each digit represented as WRSFCEA:</p> <p>A: Not used</p> <p>E: EXC Error: 1 = On, 0 = Off</p> <p>C: Calibration Error: 1 =On, 0 = Off</p> <p>F: Status flag: 0=Normal;1=OFL1;2=OFL2;3=Not Defined; 4=Not Defined; 5=Control Deviation Over;6=Flow Over;7=+LOAD;8=-LOAD</p> <p>S: Status flags: 0=Over/Under Comparison off; 1=Weighing; 2=Zero Calibrating; 3=Span Calibrating</p> <p>R: RUN: 1=On, 0=Off</p> <p>W: Weight Increase: 1= On, 0= Off</p>
5	W00	Operation Mode
6	W01	Target
7	W02	Converted Target Value



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20	-	Command number to be sent to the F805-CF (Table 5)
21	-	Parameter for command being sent to the F805-CF
22	-	Response data from F805-CF
23	-	Command number is echoed into this register.
24	-	Command error register: Contains 0 if no error, 1 on Command number error, and 2 on Command data error.



Table 5 – Command Numbers for Device Data Type 1

Command Number	F805-CF Command Used	DESCRIPTION
0	N/A	Clear the command registers – no command is sent to the F805-CF.
1	CL	Accumulation Clear.
2	CK	Alarm Reset.
3	CH	Stop.
4	CG	Start.
5	CD	Refilling Complete
6	CC	Refilling Start.
7	W00000xx	<p>Operation Mode: xx is the desired mode of operation.</p> <p>0 = Continuous</p> <p>1 = Batch</p> <p>2 = Fixed</p> <p>3 = Fixed and Accumulate</p> <p>3 = Auto Coordinate</p> <p>4 = Volumetric</p> <p>5 = EXT. Select</p>
8	W01xxxx	Target: xxxx is the desired target value. Values range from 0 to 99999.



4.3.6 Register Mappings – Scale Configuration Datasets

The Scale Configuration Datasets allow the F805-CF configuration to be read from and written to the device. The registers are not constantly read. The data registers are only updated after a command is given, and only affected registers are updated. The last five registers are used to perform commands on the dataset, such as reading all the values from the F805-CF. The tables below (Table 6 through Table 28) show the Unipulse serial command that corresponds to a register in each dataset and give a list of possible commands to send to the F805-CF. The procedure for sending commands is the same for each dataset and is given in Section 4.3.7.

Table 6 – Scale Configuration (Each Code) Dataset Register Mapping (Device Data Type 2)

REGISTER	F805-CF Command Used	F805-CF Configuration Section	DESCRIPTION
1	W03	Each Code	Code (for setting value)
2	W04	Each Code	Proportion Band (P)
3	W05	Each Code	Integral Time (I)
4	W06	Each Code	Differential Time (D)
5	W07	Each Code	Calculation Time
6	W08	Each Code	Sampling Count
7	W09	Each Code	AT Coordinate Value 1
8	W0A	Each Code	AT Coordinate Value 2
9	W0B	Each Code	AT Coordinate Value 3
10	W0C	Each Code	AT Coordinate Value 4
11	W0D	Each Code	Code (for operating)
20	-	-	Command number to be sent to the F805-CF (Table 7)
21	-	-	Parameter for command being sent to the F805-CF
22	-	-	Response data from F805-CF
23	-	-	Command number is echoed into this register.
24	-	-	Command error register: Contains 0 if no error, 1 on Command number error, and 2 on Command data error.



Table 7 - Command Numbers for Device Data Type 2

Command Number	F805-CF Command Used	DESCRIPTION
0	N/A	Clear the command registers – no command is sent to the F805-CF. No data required for this command.
1	N/A	Reads all data set registers from the F805-CF
2	W03000xx	Code (for setting value); xx represents the given parameter. Valid range: 0 – 99.
3	W04xxxxx	Proportion Band (P); xxxxx represents the given parameter. Valid range: 1 – 99999
4	W05xxxxx	Integral Time (I); xxxxx represents the given parameter. Valid range: 1 – 99999
5	W060xxxx	Differential Time (D); xxxx represents the given parameter. Valid range: 0 – 9999
6	W0700xxx	Calculation Time; xxx represents the given parameter. Valid range: 1 – 180
7	W08000xx	Sampling Count; xx represents the given parameter. Valid range: 1 – 99
8	W09xxxxx	AT Coordinate Value 1; xxxxx represents the given parameter. Valid range: 0 – 99999
9	W0Axxxxx	AT Coordinate Value 2; xxxxx represents the given parameter. Valid range: 0 – 99999
10	W0Bxxxxx	AT Coordinate Value 3; xxxxx represents the given parameter. Valid range: 0 – 99999
11	W0Cxxxxx	AT Coordinate Value 4; xxxxx represents the given parameter. Valid range: 0 – 99999
12	W0D000xx	Code (for operating); xxxxx represents the given parameter. Valid range: 0 – 99



Table 8 - Scale Configuration (Flow Parameter) Dataset Register Mapping (Device Data Type 3)

REGISTER	F805-CF Command Used	F805-CF Configuration Section	DESCRIPTION
1	W10	Flow Parameter	Furnish Flow value
2	W11	Flow Parameter	Flow – number of decimal points used
3	W12	Flow Parameter	Flow Units
4	W13	Flow Parameter	Flow Division
5	W14	Flow Parameter	Control Limit
6	W15	Flow Parameter	Flow – Sign
7	W16	Flow Parameter	Allowable Control Dev.
8	W17	Flow Parameter	Rate Limit
9	W18	Flow Parameter	Fault Detect Value
10	W19	Flow Parameter	Alarm Time
11	W1A	Flow Parameter	Start Time
12	W1B	Flow Parameter	First Stability Time
13	W1C	Flow Parameter	Dead band
14	W1D	Flow Parameter	Calculation direct
20	-	-	Command number to be sent to the F805-CF (Table 9)
21	-	-	Parameter for command being sent to the F805-CF
22	-	-	Response data from F805-CF
23	-	-	Command number is echoed into this register.
24	-	-	Command error register: Contains 0 if no error, 1 on Command number error, and 2 on Command data error.



Table 9 - Command Numbers for Device Data Type 3

Command Number	F805-CF Command Used	DESCRIPTION
0	N/A	Clear the command registers – no command is sent to the F805-CF. No data required for this command.
1	N/A	Reads all data set registers from the F805-CF
2	W10xxxx	Furnish Flow value; xxxxx represents the given parameter. Valid range: 0 – 99999
3	W110000x	Flow – number of decimal points used; x represents the given parameter. Decimal point position multiplier: 0 = 1 1 = 0.1 2 = 0.01 3 = 0.001
4	W120000x	Flow Units; x represents the given parameter. Valid Units: 0 = g/minute 1 = Kg/minute 2 = Kg/hour 3 = T/Hour 4 = lbs./minute 5 = lbs./hour
5	W130000x	Flow Division; xxx represents the given parameter. Valid range: 1 – 100
6	W140000x	Control Limit; xxx represents the given parameter. Valid range: 0 – 5000
7	W150000x	Flow – Sign; x represents the given parameter. 0 = Off 1 = On
8	W160000x	Allowable Control Deviation; xxx represents the given parameter.



		Valid range: 0 – 999
9	W1700xxx	Rate Limit; 00xxx represents the given parameter. Valid range: 0 – 999
10	W180xxxx	Fault Detect Value; xxxx represents the given parameter. Valid range: 0 – 9999
11	W1900xxx	Alarm Time; xxx represents the given parameter. Valid range: 0 – 999
12	W1A000xx	Start Time; xx represents the given parameter. Valid range: 0 – 99
13	W1B000xx	First Stability Time; xx represents the given parameter. Valid range: 0 – 99
14	W1C0xxxx	Dead band; xxxx represents the given parameter. Valid range: 0 – 9999
15	W1D0000x	Calculation direct; x represents the given parameter. 0 = Decrease 1 = Increase



Table 10 - Scale Configuration (Comparison) Dataset Register Mapping (Device Data Type 4)

REGISTER	F805-CF Command Used	F805-CF Configuration Section	DESCRIPTION
1	W20	Comparison	Upper Limit
2	W21	Comparison	Lower Limit
3	W22	Comparison	Refilling Complete Weight
4	W23	Comparison	Refilling Start Weight
5	W24	Comparison	Maximum Revolution
6	W25	Comparison	Minimum Revolution
7	W26	Comparison	Upper/Lower Output Mode
8	W27	Comparison	Valid Accumulation Digits
9	W28	Comparison	Accumulator Final
10	W29	Comparison	Accumulator Pulse Rate
11	W2A	Comparison	+ OR – Accumulate
12	W2B	Comparison	Near Zero
13	W2C	Comparison	Accumulation Band
20	-	-	Command number to be sent to the F805-CF (Table 11)
21	-	-	Parameter for command being sent to the F805-CF
22	-	-	Response data from F805-CF
23	-	-	Command number is echoed into this register.
24	-	-	Command error register: Contains 0 if no error, 1 on Command number error, and 2 on Command data error.



Table 11 - Command Numbers for Device Data Type 4

Command Number	F805-CF Command Used	DESCRIPTION
0	N/A	Clear the command registers – no command is sent to the F805-CF. No data required for this command.
1	N/A	Reads all data set registers from the F805-CF
2	W200xxxx	Upper Limit; xxxx represents the given parameter. Valid range: 1 – 1000
3	W2100xxx	Lower Limit; xxx represents the given parameter. Valid range: 0 – 999
4	W220xxxx	Refilling Complete Weight; xxxx represents the given parameter. Valid range: 1 – 1000
5	W2300xxx	Refilling Start Weight; xxx represents the given parameter. Valid range: 0 –999
6	W240xxxx	Maximum Revolution; xxxx represents the given parameter. Valid range: 1 – 1000
7	W2500xxx	Minimum Revolution; xxx represents the given parameter. Valid range: 0 – 999
8	W260000x	Upper/Lower Output Mode; x represents the given parameter. 0 = Output Regularly 1 = Output Run
9	W270000x	Valid Accumulation Digits; x represents the given parameter. Decimal point position multiplier: 0 = 10 1 = 1 2 = 0.1 3 = 0.01 4 = 0.001
10	W28xxxxxxxx	Accumulator Final; xxxxxxxx represents the given parameter. Valid range: 0 – 999999999



11	W290000x	Accumulator Pulse Rate; x represents the given parameter. 0 = 500 ms 1 = 200 ms 2 = 100 ms 3 = 50 ms 4 = 25 ms
12	W2A0000x	+ OR – Accumulate; x represents the given parameter. 0 = Accumulator Decrease 1 = Accumulator Increase
13	W2Bxxxxx	Near Zero; xxxxx represents the given parameter. Valid range: 0 – 99999
14	W2Cxxxxx	Accumulation Band; xxxxx represents the given parameter. Valid range: 0 – 99999



Table 12 - Scale Configuration (Operation) Dataset Register Mapping (Device Data Type 5)

REGISTER	F805-CF Command Used	F805-CF Configuration Section	DESCRIPTION
1	W30	Operation	Flow Display Frequency
2	W31	Operation	Digital Filter 1
3	W32	Operation	Analog Filter
4	W33	Operation	Digital Filter 2
5	W34	Operation	FF Mode Select
6	W35	Operation	MD (Period)
7	W36	Operation	MD (Range)
8	W37	Operation	FF
9	W38	Operation	FF Coefficient
10	W39	Operation	FF Regulation
11	W3A	Operation	Revolution Input CH
20	-	-	Command number to be sent to the F805-CF (Table 13)
21	-	-	Parameter for command being sent to the F805-CF
22	-	-	Response data from F805-CF
23	-	-	Command number is echoed into this register.
24	-	-	Command error register: Contains 0 if no error, 1 on Command number error, and 2 on Command data error.



Table 13 - Command Numbers for Device Data Type 5

Command Number	F805-CF Command Used	DESCRIPTION
0	N/A	Clear the command registers – no command is sent to the F805-CF. No data required for this command.
1	N/A	Reads all data set registers from the F805-CF
2	W3000xxx	Flow Display Frequency; xxx represents the given parameter. Valid range: 1 – 200
3	W310000x	Digital Filter 1; x represents the given parameter. 0 = off 1 = 2 times 2 = 4 times 3 = 8 times 4 = 16 times 5 = 32 times 6 = 64 times 7 = 128 times
4	W320000x	Analog Filter; x represents the given parameter. 0 = 2 Hz 1 = 4 Hz 2 = 6 Hz 3 = 8 Hz
5	W330000x	Digital Filter 2; x represents the given parameter. 0 = On 1 = Off
6	W340000x	FF Mode Select; x represents the given parameter. 0 = RF. CPS OFF 1 = RF. CPS ON 2 = Accum. Mode
7	W35000xx	MD (Period); xx represents the given parameter.



		Valid range: 0 – 99
8	W3600xx	MD (Range); xx represents the given parameter. Valid range: 0 – 99
9	W370xxx	FF; xxx represents the given parameter. Valid range: 0 – 9999
10	W38000x	FF Coefficient; x represents the given parameter. 0 = 1 1 = 3/4 2 = 2/4 3 = 1/4
11	W390xxx	FF Regulation; xxx represents the given parameter. Valid range: 0 – 9999
12	W3A000x	Revolution Input CH; x represents the given parameter. 0 = None 1 = Pulse Input 2 = AI CH 1 3 = AI CH 2



Table 14 - Configuration (Function) Dataset Register Mapping (Device Data Type 6)

REGISTER	F805-CF Command Used	F805-CF Configuration Section	DESCRIPTION
1	W40	Function	Preset Tare Weight 1
2	W41	Function	Preset Tare Weight 2
3	W42	Function	Auto Accum. Command
4	W43	Function	Top Display Key
5	W44	Function	Weighing Code Selection
20	-	-	Command number to be sent to the F805-CF (Table 15)
21	-	-	Parameter for command being sent to the F805-CF
22	-	-	Response data from F805-CF
23	-	-	Command number is echoed into this register.
24	-	-	Command error register: Contains 0 if no error, 1 on Command number error, and 2 on Command data error.



Table 15 - Command Numbers for Device Data Type 6

Command Number	F805-CF Command Used	DESCRIPTION
0	N/A	Clear the command registers – no command is sent to the F805-CF. No data required for this command.
1	N/A	Reads all data set registers from the F805-CF
2	W400000x	Preset Tare Weight 1; x represents the given parameter. 0 = Off 1 = On
3	W41xxxx	Preset Tare Weight 2; xxxxx represents the given parameter. Valid range: 0 – 99999
4	W420000x	Auto Accum. Command; x represents the given parameter. 0 = Off 1 = On
5	W430xxxx	Top Display Key; xxxx represents the given parameter. See the “Dataset Value” column in Table 16 for a complete list of valid command parameters.
6	W440000x	Weighing Code Selection; x represents the given parameter. 0 = Key Input 1 = External Input



Table 16 - Top Display Key Values

Dataset Value	Serial Command	Result (“Top Display Key” on “Function” screen)			
		Run	RF (Refilling)	TG	Data
0	W4300000	Off	Off	Off	Off
1	W4300001	Off	Off	Off	On
2	W4300010	Off	Off	On	Off
3	W4300011	Off	Off	On	On
4	W4300100	Off	On	Off	Off
5	W4300101	Off	On	Off	On
6	W4300110	Off	On	On	Off
7	W4300111	Off	On	On	On
8	W4301000	On	Off	Off	Off
9	W4301001	On	Off	Off	On
10	W4301010	On	Off	On	Off
11	W4301011	On	Off	On	On
12	W4301100	On	On	Off	Off
13	W4301101	On	On	Off	On
14	W4301110	On	On	On	Off
15	W4301111	On	On	On	On



Table 17 - Configuration (Control Parameter) Dataset Register Mapping (Device Data Type 7)

REGISTER	F805-CF Command Used	F805-CF Configuration Section	DESCRIPTION
1	W50	Control Parameter	Master/Slave Select
2	W51	Control Parameter	Slave Mode Select
3	W52	Control Parameter	Start / Error Display
4	W53	Control Parameter	Flow Stability Time
5	W54	Control Parameter	Start Coordinate Value
6	W55	Control Parameter	Control Frequency
7	W56	Control Parameter	Sample Count of Refilling Start
8	W57	Control Parameter	Sample Count of Refilling Complete
9	W58	Control Parameter	Auto Coordinate of Refilling
10	W59	Control Parameter	Continuous Value
20	-	-	Command number to be sent to the F805-CF (Table 18)
21	-	-	Parameter for command being sent to the F805-CF
22	-	-	Response data from F805-CF
23	-	-	Command number is echoed into this register.
24	-	-	Command error register: Contains 0 if no error, 1 on Command number error, and 2 on Command data error.



Table 18 - Command Numbers for Device Data Type 7

Command Number	F805-CF Command Used	DESCRIPTION
0	N/A	Clear the command registers – no command is sent to the F805-CF. No data required for this command.
1	N/A	Reads all data set registers from the F805-CF
2	W500000x	Master/Slave Select; x represents the given parameter. 0 = Single 1 = Master 2 = Slave
3	W510000x	Slave Mode Select; x represents the given parameter. 0 = Flow Follow 1 = Flow – Stop Follow 2 = Target Follow 3 = Target – Stop Follow
4	W520000x	Start / Error Display; x represents the given parameter. 0 = Real Time Display 1 = Target Display
5	W53000xx	Flow Stability Time; xx represents the given parameter. Valid range: 0 – 99
6	W540xxxx	Start Coordinate Value; xxxx represents the given parameter. Valid range: 0 – 1000
7	W55000xx	Control Frequency; xx represents the given parameter. Valid range: 1 – 99
8	W5600xxx	Sample Count of Refilling Start; xxx represents the given parameter. Valid range: 0 – 300
9	W5700xxx	Sample Count of Refilling Complete; xxx represents the given parameter. Valid range: 0 – 300
10	W580000x	Auto Coordinate of Refilling; x represents the given parameter. 0 = Off



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		1 = On (Init) 2 = On (No Init)
11	W590000x	Continuous Value; x represents the given parameter. 0 = Off 1 = RF start data 2 = RF Comp. data



Table 19 - Configuration (States Ascertain) Dataset Register Mapping (Device Data Type 8)

REGISTER	F805-CF Command Used	F805-CF Configuration Section	DESCRIPTION
1	W60	States Ascertain	Upper Limit Over
2	W61	States Ascertain	Lower Limit Under
3	W62	States Ascertain	Over Maximum Revs
4	W63	States Ascertain	Under Maximum Revs
5	W64	States Ascertain	Con Deviation Over
6	W65	States Ascertain	Con Deviation Under
7	W66	States Ascertain	Flow Rate Over
8	W67	States Ascertain	Flow Rate Under
9	W68	States Ascertain	Refilling Time
10	W69	States Ascertain	WGT Time Limit expired
11	W6A	States Ascertain	COTL Time limit expired
20	-	-	Command number to be sent to the F805-CF (Table 20)
21	-	-	Parameter for command being sent to the F805-CF
22	-	-	Response data from F805-CF
23	-	-	Command number is echoed into this register.
24	-	-	Command error register: Contains 0 if no error, 1 on Command number error, and 2 on Command data error.



Table 20 - Command Numbers for Device Data Type 8

Command Number	F805-CF Command Used	DESCRIPTION
0	N/A	Clear the command registers – no command is sent to the F805-CF. No data required for this command.
1	N/A	Reads all data set registers from the F805-CF
2	W600000x	Upper Limit Over; x represents the given parameter. 0 = Run 1 = Stop
3	W610000x	Lower Limit Under; x represents the given parameter. 0 = Run 1 = Stop
4	W6200xxx	Over Maximum Revs; xxx represents the given parameter. Valid range: 0 – 999
5	W6300xxx	Under Maximum Revs; xxx represents the given parameter. Valid range: 0 – 999
6	W6400xxx	Con Deviation Over; xxx represents the given parameter. Valid range: 0 – 999
7	W6500xxx	Con Deviation Under; xxx represents the given parameter. Valid range: 0 – 999
8	W6600xxx	Flow Rate Over; xxx represents the given parameter. Valid range: 0 – 999
9	W6700xxx	Flow Rate Under; xxx represents the given parameter. Valid range: 0 – 999
10	W6800xxx	Refilling Time; xxx represents the given parameter. Valid range: 0 – 999
11	W6900xxx	WGT Time Limit expired; xxx represents the given parameter. Valid range: 0 – 999
12	W6A00xxx	COTL Time limit expired; xxx represents the given parameter. Valid range: 0 – 999



Table 21 - Configuration (Auto Coordinate) Dataset Register Mapping (Device Data Type 9)

REGISTER	F805-CF Command Used	F805-CF Configuration Section	DESCRIPTION
1	W70	Auto Coordinate	Auto Coordinate Time
2	W71	Auto Coordinate	Auto Coordinate output 1
3	W72	Auto Coordinate	Auto Coordinate output 2
4	W73	Auto Coordinate	Auto Coordinate output 3
5	W74	Auto Coordinate	Auto Coordinate output 4
20	-	-	Command number to be sent to the F805-CF (Table 22)
21	-	-	Parameter for command being sent to the F805-CF
22	-	-	Response data from F805-CF
23	-	-	Command number is echoed into this register.
24	-	-	Command error register: Contains 0 if no error, 1 on Command number error, and 2 on Command data error.



Table 22 - Command Numbers for Device Data Type 9

Command Number	F805-CF Command Used	DESCRIPTION
0	N/A	Clear the command registers – no command is sent to the F805-CF. No data required for this command.
1	N/A	Reads all data set registers from the F805-CF
2	W7000xx	Auto Coordinate Time; xx represents the given parameter. Valid range: 0 – 99
3	W710xxxx	Auto Coordinate output 1; xxxx represents the given parameter. Valid range: 0 – 1000
4	W720xxxx	Auto Coordinate output 2; xxxx represents the given parameter. Valid range: 0 – 1000
5	W730xxxx	Auto Coordinate output 3; xxxx represents the given parameter. Valid range: 0 – 1000
6	W740xxxx	Auto Coordinate output 4; xxxx represents the given parameter. Valid range: 0 – 1000



Table 23 - Configuration (Calibration) Dataset Register Mapping (Device Data Set 10)

REGISTER	F805-CF Command Used	F805-CF Configuration Section	DESCRIPTION
1	W80	Calibration	Calibrating Weight
2	W81	Calibration	Capacity
3	W82	Calibration	Minimum scale division
4	W83	Calibration	Weight Over
5	W84	Calibration	Decimal point
6	W85	Calibration	Unit Display
7	W86	Calibration	Hopper volume
8	W87	Calibration	Gravitational Acceleration
9	W88	Calibration	Loadcell Excitation
10	W89	Calibration	Bulk density
11	W8A	Calibration	Hopper Display
20	-	-	Command number to be sent to the F805-CF (Table 24)
21	-	-	Parameter for command being sent to the F805-CF
22	-	-	Response data from F805-CF
23	-	-	Command number is echoed into this register.
24	-	-	Command error register: Contains 0 if no error, 1 on Command number error, and 2 on Command data error.



Table 24 - Command Numbers for Device Data Type 10

Command Number	F805-CF Command Used	DESCRIPTION
0	N/A	Clear the command registers – no command is sent to the F805-CF. No data required for this command.
1	N/A	Reads all data set registers from the F805-CF
2	W80xxxx	Calibrating Weight; xxxxx represents the given parameter. Valid range: 0 – 99999
3	W81xxxx	Capacity; xxxxx represents the given parameter. Valid range: 0 – 99999
4	W8200xx	Minimum scale division; xxx represents the given parameter. Valid range: 1 – 100
5	W83xxxx	Weight Over; xxxxx represents the given parameter. Valid range: 0 – 99999
6	W84000x	Decimal point; x represents the given parameter. Decimal Point position multiplier 0 = 1 1 = 0.1 2 = 0.01 3 = 0.001
7	W85000x	Unit Display; x represents the given parameter. Decimal Point position multiplier 0 = g 1 = kg 2 = t 3 = lbs
8	W86xxxx	Hopper volume; xxxxx represents the given parameter. Valid range: 0 – 99999
9	W87000xx	Gravitational Acceleration; xx represents the given parameter. See Table 25



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10	W880000x	Loadcell Excitation; x represents the given parameter. 0 = 5v 1 = 10v
11	W8900xxx	Bulk density; xxx represents the given parameter. Valid range: 1 – 999
12	W8A0000x	Hopper Display; x represents the given parameter. 0 = U/L Display 1 = Refil. Display



Table 25 - Gravitational Constants

Serial Command	Gravitational Constant (m/s²)
W8700001	9.806
W8700002	9.805
W8700003	9.804
W8700004	9.803
W8700005	9.802
W8700006	9.801
W8700007	9.800
W8700008	9.799
W8700009	9.798
W8700010	9.797
W8700011	9.796
W8700012	9.795
W8700013	9.794
W8700014	9.793
W8700015	9.792
W8700016	9.791



Table 26 - Configuration (D/A Converter) Dataset Register Mapping (Device Data Type 11)

REGISTER	F805-CF Command Used	F805-CF Configuration Section	DESCRIPTION
1	WC0	D/A Converter	D/A Output Channel
2	WC1	D/A Converter	D/A Output Mode
3	WC2	D/A Converter	D/A Zero Output Weight
4	WC3	D/A Converter	D/A Full Scale Value
5	WC4	D/A Converter	D/A Output Compensation
6	WC9	D/A Converter	Pulse Type Selection
7	WCA	D/A Converter	Pulse – Sign Selection
8	WCB	D/A Converter	Pulse Full Scale
20	-	-	Command number to be sent to the F805-CF (Table 27)
21	-	-	Parameter for command being sent to the F805-CF
22	-	-	Response data from F805-CF
23	-	-	Command number is echoed into this register.
24	-	-	Command error register: Contains 0 if no error, 1 on Command number error, and 2 on Command data error.



Table 27 - Command Numbers for Device Data Type 11

Command Number	F805-CF Command Used	DESCRIPTION
0	N/A	Clear the command registers – no command is sent to the F805-CF. No data required for this command.
1	N/A	Reads all data set registers from the F805-CF
2	WC00000x	D/A Output Channel; x represents the given parameter. 0 = CH 1 1 = CH 2
3	WC10000x	D/A Output Mode; x represents the given parameter. 0 = 4mA Output 1 = 20mA Output 2 = Interlock (W) 3 = Interlock (F) 4 = Interlock (-F) 5 = Interlock (C)
4	WC2xxxxx	D/A Zero Output Weight; xxxxx represents the given parameter. Valid Range: 0 – 99998
5	WC3xxxxx	D/A Full Scale Value; xxxxx represents the given parameter. Valid Range: 1 – 99999
6	WC40xxxx	D/A Output Compensation; xxxx represents the given parameter. Valid Range: 1 – 1000
7	WC90000x	Pulse Type Selection; x represents the given parameter. 0 = Off 1 = Double Input 2 = Single Input
8	WCA0000x	Pulse – Sign Selection; x represents the given parameter. 0 = -Sign Off 1 = Sign On
9	WCB0xxxx	Pulse Full Scale; 0xxxx represents the given parameter.



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		Valid Range: 1 – 9999
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Table 28 – Scale Configuration (Analog I/O) Dataset Register Mapping (Device Data Type 12)

REGISTER	F805-CF Command Used	F805-CF Configuration Section	DESCRIPTION
1	WD0	Analog I/O	AO Output Channel
2	WD1	Analog I/O	AO Output Mode
3	WD2	Analog I/O	AO Zero Output Weight
4	WD3	Analog I/O	AO Full Scale Value
5	WD4	Analog I/O	AO Output Compensation
6	WD5	Analog I/O	AI Target
7	WD6	Analog I/O	AI Input Channel
8	WD7	Analog I/O	AI Digital Filter
20	-	-	Command number to be sent to the F805-CF (Table 29)
21	-	-	Parameter for command being sent to the F805-CF
22	-	-	Response data from F805-CF
23	-	-	Command number is echoed into this register.
24	-	-	Command error register: Contains 0 if no error, 1 on Command number error, and 2 on Command data error.



Table 29 - Command Numbers for Device Data Type 12

Command Number	F805-CF Command Used	DESCRIPTION
0	N/A	Clear the command registers – no command is sent to the F805-CF. No data required for this command.
1	N/A	Reads all data set registers from the F805-CF
2	WD0000x	AO Output Channel; x represents the given parameter. 0 = CH 1 1 = CH 2 2 = CH 3
3	WD1000x	AO Output Mode; x represents the given parameter. 0 = 4mA Output 1 = 20mA Output 2 = Interlock (W) 3 = Interlock (F) 4 = Interlock (-F) 5 = Interlock (C)
4	WD2xxxx	AO Zero Output Weight; xxxxx represents the given parameter. Valid Range: 0 – 99998
5	WD3xxxx	AO Full Scale Value; xxxxx represents the given parameter. Valid Range: 1 – 99999
6	WD40xxx	AO Output Compensation; xxxxx represents the given parameter. Valid Range: 0 – 1000
7	WD5000x	AI Target; x represents the given parameter. 0 = None 1 = CH 1 2 = CH 2
8	WD6000x	AI Input Channel; x represents the given parameter. 0 = CH 1 1 = CH 2



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9	WD70000x	AI Digital Filter; x represents the given parameter. 0 = Off 1 = 2 Times 2 = 4 Times 3 = 8 Times 4 = 16 Times 5 = 32 Times 6 = 64 Times
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4.3.7 Command Register Interface

The command registers in each dataset are used by entering a parameter (if required) into the Command Parameter register and then entering a command number into the Command register. The Command Error, Command Echo, and Command Response registers give feedback on the result of the command. Table 30 below gives the register number for each command register. The same command register layout is used at the end of each output dataset.

If an incorrect command number is given, the Command Error register will be set to 1. If an invalid parameter is given, the Command Error register will be set to 2. If the command fails to execute properly, the Command Error register will be set to 3. When the Command Error register is zero, the given command is without error.

The procedure for sending commands is the same for each dataset and is given below:

- For commands that do not require any parameters, simply write the command number into R20. Note: for commands that require parameters, write the parameter values into R21 first, then write the command number. The write order is important because the command is immediately sent when a change in R20 is detected.
- The command execution will begin. All invalid commands are ignored, and R24 is asserted to 1. If the command data is invalid, R24 is asserted to 2. If the command fails to execute, R24 is set to 3. For valid command numbers, the driver will format the command and send it to the F805-CF.
- If the command completes successfully, R20 and R21 will be set to 0, and the command number will be written into register R23. Register R24 will be set to 0. If a response is received from the F805-CF, it will be written into register R22. Other registers in the data set that should be affected by a give command will be updated upon next read from the F805-CF.

Table 30 - Command registers

Dataset Register	Description
20	Command
21	Command Parameter
22	Command Response
23	Command Echo
24	Command Error



5 Operational Check

5.1 Scope

The following sections provide some assistance to ensure the interface is working properly.

5.2 Verify Hardware and Software Version Number

The user can verify that the UniPulse F805-CF driver has been installed using the DeltaV Diagnostics tool. The Diagnostics tool will show the Hardware Revision No. (HwRev) and the Software Revision No. (SwRev).

To begin the DeltaV Diagnostic tool select Start-> DeltaV-> Operator-> Diagnostics. In the Diagnostics tool expand the Controller, I/O and then double click on the Programmable Serial Interface Card that has the driver installed.

The following information will be displayed:

SwRev	Software Revision	1.10	(or later)
HwRev	Hardware Revision	2.3	(or later)

5.3 Verify Configuration

- Verify port configuration: The serial port must be enabled. It must be set to Master mode. User needs to make sure communication settings such as baud rate, parity, and number of data bits matches the UniPulse F805-CF settings.
- Verify Dataset configuration as described above.



5.4 Verify I/O Communication with Control Studio

- User can create I/O modules in the control studio to verify correct values are read and written between the foreign device and the PSIC. For input data, the values should be changed in the foreign device and verified that the new data are correctly reported.
- To assign a Dataset and a register in the Dataset to an I/O module, follow these steps:
 1. Double click the IO_IN/IO_OUT parameter for the module. This brings up the IO_IN/IO_OUT Property window.
 2. Click on the Browse button. This brings up the Browse window.
 3. Click on the Object_Type drop down list, select All. This displays all the Dataset tags.
 4. Double click on the desired Dataset tag. This assigns the tag to the module and closes the Browse window.
 5. Choose the desired register in the Parameter drop down list.
 6. Click the OK button.

5.5 Using Diagnostics

- Verify PSIC communication: Select the PSIC on Diagnostics and press the right mouse button. Select Display Real -Time Statistics from the drop down menu. If the Programmable Serial Interface Card is functioning then the user will see the Valid Responses counter and the Async and/or Sync Transactions counters incrementing. There will not be any error statistics counting up.
- Verify port statistics: Select the Port on the Programmable Serial Interface Card and press the right mouse button. Then select Display Port Statistics from the drop down menu. Verify that the port communications statistics are being displayed properly and are counting as expected for the protocol's functionality.
- Verify dataset values: Select a dataset and press the right mouse button. Select View Dataset Registers from the Drop down window. Verify that the dataset values are displayed as expected.

5.6 LED Indication

The Yellow LED for the port should be on solid when all communications on that port are valid. The Yellow LED should be blinking if there is some valid communications and some communications with errors on that port. The Yellow LED should be OFF if there are no valid communications on that port.



6 DeltaV–Field Device Electrical Interface

Each PSIC has 2 ports. The UniPulse F805-CF is expected to operate in RS-232 or RS-422 full duplex mode.

6.1 Pin Assignments for DeltaV PSIC

Table 31 - RS-232 Standard

Terminal Number	Signal Description
1	Port 1 – Isolated Ground (GND)
2	Unused
3	Port 1 – TXD
4	Unused
5	Port 1 – RXD
6	Unused
7	Port 1 – DTR
8	Port 1 – DSR
9	Port 2 – Isolated Ground (GND)
10	Unused
11	Port 2 – TXD
12	Unused
13	Port 2 – RXD
14	Unused
15	Port 2 – DTR
16	Port 2 – DSR



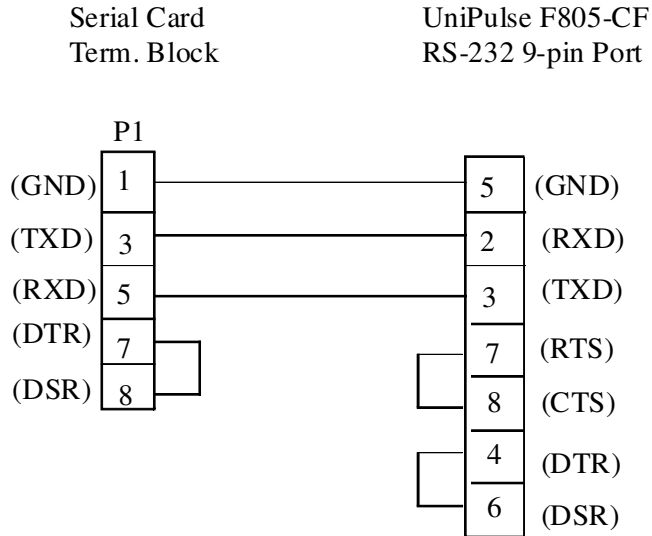
Table 32 - RS-422 Standard

Terminal Number	Signal Description
1	Port 1 – Isolated Ground (GND)
2	Port 1 – TXD+
3	Unused
4	Port 1 – TXD-
5	Unused
6	Port 1 – RXD+
7	Unused
8	Port 1 – RXD-
9	Port 2 – Isolated Ground (GND)
10	Port 2 – TXD+
11	Unused
12	Port 2 – TXD-
13	Unused
14	Port 2 – RXD+
15	Unused
16	Port 2 – RXD-



6.2 Wiring Connections (RS-232)

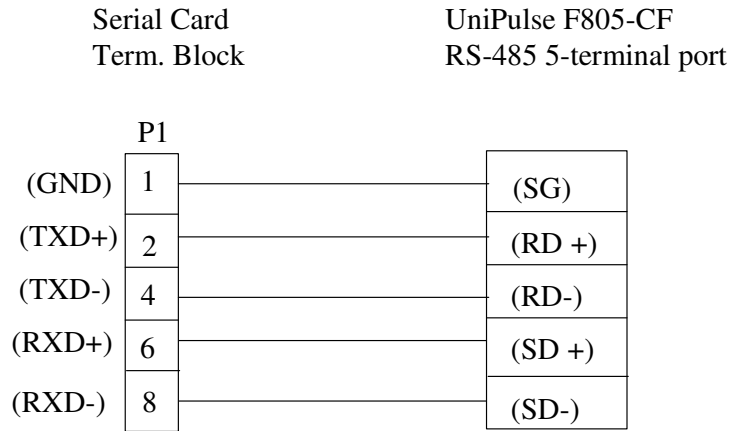
The figure below shows the connections between the UniPulse F805-CF RS-232 9-pin port and Port 1 on the Serial Card Termination Block.





6.3 Wiring Connections (RS-422)

The figure below shows the connections between the UniPulse F805-CF RS-422 5-terminal port and Port 1 on the Serial Card Termination Block.





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7 Technical Support

For technical support or to report a defect, please give Mynah Technologies a call at (636) 681-1555. If a defect is discovered, please document it in as much detail as possible and then fax your report to us at (636) 681-1660.

You can also send us your questions via e-mail. Our address is:

support@mynah.com

Thank you for using DeltaV.