### Algorithms

#### Monitor/Control Signals

- **Input Terminals**
  - RD
  - CD
  - DA

- **Output Terminals**

#### Algorithms

1. **READ INPUT/OUTPUT**
2. **CONFIGURE DATA**
3. **DUMP DATA**
4. **BREAKPOINT LINEARIZER**
5. **CALIBRATED ANALOG OUTPUT**

#### Wired Signals

- **RS232C**
- **Wiring Table Designations. Refer to Page 2 of WSD (Figure 2) drawing for physical layout/connection location.**

#### Legend

- **RD** = Algorithm Number
- ( ) = Wiring Table Designations. Refer to Page 2 of WSD (Figure 2) drawing for physical layout/connection location.
- = Begin Algorithm
- = End Algorithm

### Field-Equipment

#### Analog Input

- 4/20mA DC
- EXT 250 ohm Res.

#### Analog Output

- 4/20 mA DC
- (OR SPECIFIED)

#### Filter Delay

- 0/999" 1ea

#### Configurations

1. **BP1**
2. **BP2**
3. **BP3**
4. **BP4**
5. **BP5**
6. **BP6**
7. **BP7**
8. **BP8**
9. **BP9**

#### FULL SCALE IN FULL SCALE OUT.

#### IN ENGINEERING UNITS

OUT PERCENT 100

0

(ZERO SCALE IN, ZERO SCALE OUT)
Data Handler Operations

The Data Handler (SPM 9000-D2N) is designed to scale an analog input into engineering units, and the engineering units are used to control the analog output. The input/output breakpoints are settable in any configuration, Linear, Square root, Logs or Inverted.

Active Commands

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Power: 9-26 VDC @ 50 mADC
Digital Inputs: Dry Contact
Relay Contacts: 28 VDC/VAC @ 500 mADC, non-inductive
To access the DH configuration, first connect the DH puk to your computer’s serial communication port using a straight through RS232 cable. Then start a terminal program. You can use any terminal program that supports serial ASCII communications or you can use the SCADA program supplied with this shipment. The communications parameters for this DH puk is set at 1200 baud, no parity, 8 data bits and 1 stop bit.

To start configuration enter “CD” without the quotes and followed by a carriage return (Enter Key). The DH puk will respond with the following. To change any settings, enter the new setting after the prompt. To keep the current setting, enter a carriage return only. If you make an error while entering the new value, use the backspace key to back up and reenter the correct value.

**Date**: MM/DD/YY : This message will display the current date as seen from the data handler. If different than the actual date then enter it as it is formatted above (i.e. MM/DD/YY, example 03/13/90).

**Time**: HH:MM:SS : This message will display the current time as seen from the data handler. If different than the actual time then enter it as it is formatted above (i.e. HH:MM:SS, example 01:30:00). Please note this is a 24 hour clock so midnight is 23:59:59. Hit <CR> to complete the step.

**Avg. delay (1 sec)** : This entry is used to set the analog input filter delay in seconds. The analog input will be averaged for the time specified before it is used as an actual input.

**Enter BP# (IN: X, OUT: %)**: This and the following BP# entries define the breakpoints for output linearization. The zero scale and full scale endpoints are defined above where the zero scale engineering unit input is matched with the zero output value and the full scale input is matched with the full scale output. All **OUTPUT values** entered in the BP# entries should be in percent of output. All **IN values** are to be in engineering units.

**Enter BP1**: Enter in the desired value for data logging when the input is at full scale. This will complete the calibration process.

**Enter BP2**: This entry is used to set display precision. To disable this function enter “0”. This will reset the display to the default values. (i.e. 66). The most significant byte is the maximum field width and the least significant byte is the number of digits displayed to the right of the decimal.

**Date format (3)**: This entry defines the amount of date information stored with each data point. Enter a number, 0-3 from the table below to set the date format. Memory allocation is also listed, the input reading uses 2 bytes per record. 0 = No date information recorded. 1 = Day of month only recorded (add 2 bytes per record). 2 = Month/Day recorded (add 4 bytes per record). 3 = Month/Day/Year recorded (add 6 bytes per record).

**Time format (3)**: This entry defines the amount of time information stored with each data point. Enter a number, 0-3 from the table below to set the date format. Memory allocation is also listed, the input reading uses 2 bytes per record. 0 = No time information recorded. 1 = Minutes only recorded (add 2 bytes per record). 2 = Hour:Minute recorded (add 4 bytes per record). 3 = Hour:Minute:Second recorded (add 6 bytes per record).

**RTSdly**: This message will display the RTS delay setting.

**Enter Zero Input**: Enter in the desired value for data logging when the input is at full scale. This will complete the calibration process.

**Enter Full Input**: Enter in the desired value for data logging when the input is at full scale. This will complete the calibration process.

**Cal. Input (N)** : The default is “N”. If carriage return is pressed, the configuration will continue with the next line allowing changes of the engineering units without physically putting in the 0% and 100% analog signal levels. If a “Y” is entered, the actual relationship between the physical input and engineering units will be changed. This requires applying the raw input signals to the analog input. If you do not have a means to enter the raw signals at this time do not enter “Y”.

**Enter ZERO Output**: Enter in the desired value for data logging when the input is at full scale. This will complete the calibration process.

**Enter Full Output**: Enter in the desired value for data logging when the input is at full scale. This will complete the calibration process.

**Enter BP#**: Repeat the above entry process for all BP# points, where # is one less than the number of breakpoints specified.

**Reconfig Communication Setting (N)**: Enter “Y” to proceed with more communication port setups.

**Addr**: If addressing is used, enter the units address. Valid addresses are integers between 0 and 255.

**Baud**: The puk can operate at 300 or 1200 or 9600 baud. The default (-1) is 1200 baud, an entry of (3) is 300 baud and (96) is 9600 baud.

**RTSdly**: This message will display the RTS delay setting.

**Enter Zero Output**: Enter in the desired value for data logging when the input is at full scale. This will complete the calibration process.

**Enter Full Output**: Enter in the desired value for data logging when the input is at full scale. This will complete the calibration process.

**Enter BP1**: This and the following BP# entries define the breakpoints for output linearization. The zero scale and full scale endpoints are defined above where the zero scale engineering unit input is matched with the zero output value and the full scale input is matched with the full scale output. All **OUTPUT values** entered in the BP# entries should be in percent of output. All **IN values** are to be in engineering units.

**Enter BP2**: Repeat the above entry process for all BP# points, where # is one less than the number of breakpoints specified.

**Reconfig Communication Setting (N)**: Enter “Y” to proceed with more communication port setups.

**Addr**: If addressing is used, enter the units address. Valid addresses are integers between 0 and 255.

**Baud**: The puk can operate at 300 or 1200 or 9600 baud. The default (-1) is 1200 baud, an entry of (3) is 300 baud and (96) is 9600 baud.

**RTSdly**: This message will display the RTS delay setting.

**Enter Zero Output**: Enter in the desired value for data logging when the input is at full scale. This will complete the calibration process.

**Enter Full Output**: Enter in the desired value for data logging when the input is at full scale. This will complete the calibration process.

**Enter BP1**: This and the following BP# entries define the breakpoints for output linearization. The zero scale and full scale endpoints are defined above where the zero scale engineering unit input is matched with the zero output value and the full scale input is matched with the full scale output. All **OUTPUT values** entered in the BP# entries should be in percent of output. All **IN values** are to be in engineering units.

**Enter BP2**: Repeat the above entry process for all BP# points, where # is one less than the number of breakpoints specified.