D-100

Siemens P1-FLN
Network Interface Installation Guide



ONICON
Flow and Energy Measurement

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A-1 D-100 PROCESSOR BOARD

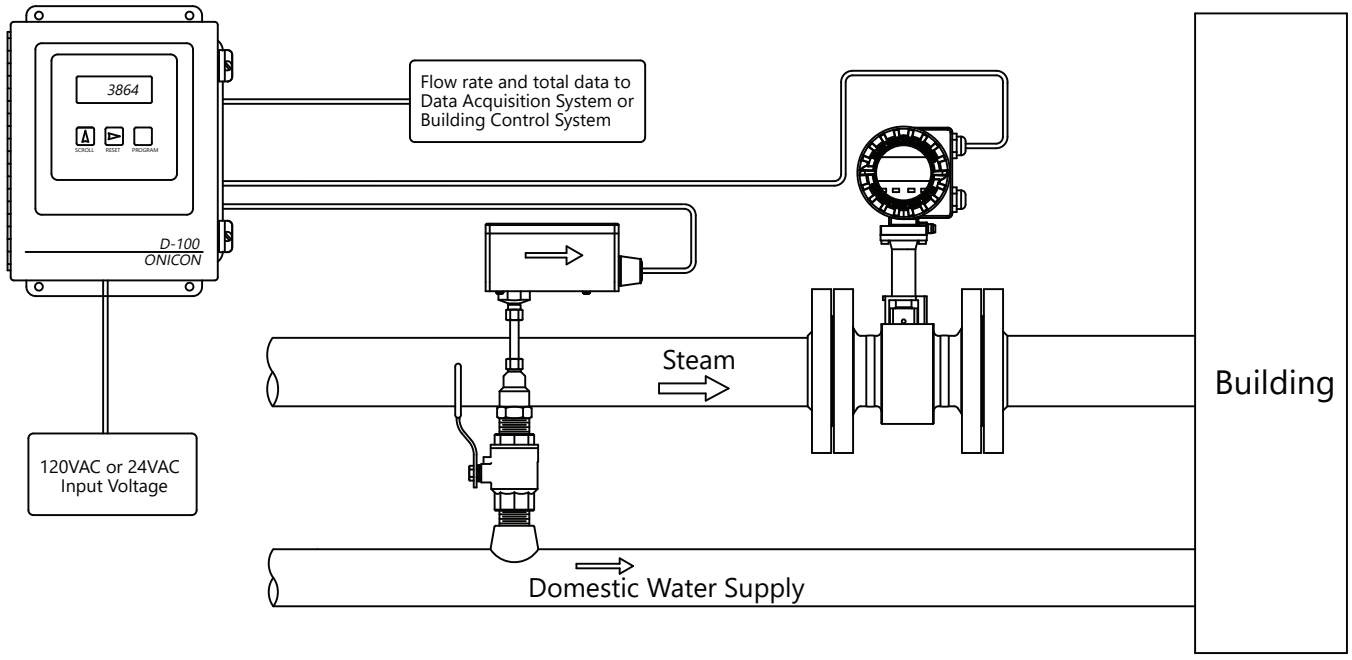
SECTION 1: INTRODUCTION

1.1 PURPOSE OF THIS GUIDE

The purpose of this guide is to provide installation and commissioning procedures and basic operating and servicing instructions for the ONICON D-100-P1 network interface.

1.2 TYPICAL D-100 NETWORK INTERFACE MODULE

The D-100 is a totalizing display module that provides a local indication of liquid, gas or steam flow rate and total data. It can also be provided with an optional Siemens P1 RS485 network interface to communicate data to the building control network.



1.3 SPECIFICATIONS

SIEMENS P1 NETWORK INTERFACE

Transceiver: 2-wire, half duplex
MAC address (device address) range: 1-99, (default: 017)
Baud rate: 4800
Termination: None

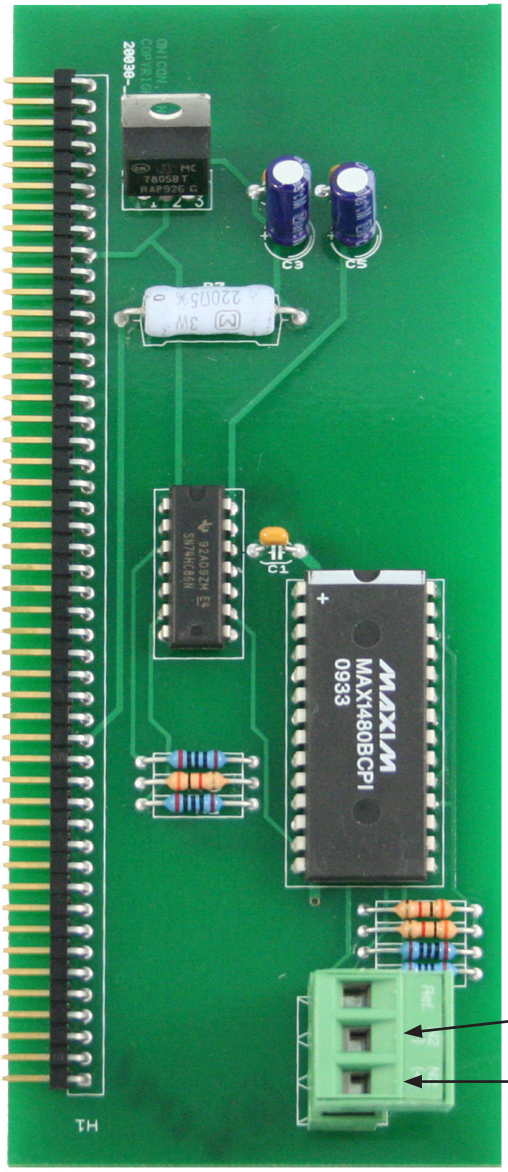
1.4 NETWORK SIGNAL CONNECTIONS

1.4.1 Standard Network Interface

P1 RS485, 2-wire (half duplex) serial output connections are connected to terminals as shown. Do not exceed 4.4 in-lb (0.5Nm) of torque when tightening.

CAUTION

Only qualified service personnel should make connections between the D-100 and the user's external equipment. ONICON assumes no responsibility for damage caused to the external equipment as a result of an improper installation.



CAUTION

Incoming and outgoing RS485 cable shield wires should be connected together, but must not be connected to the D-100.

1.4.2 Optional Network Interface With Optional Isolated Digital Pulse Input (Di3)

The D-100-P1 Display can be provided with an auxiliary input pulse for totalizing pulse outputs from external devices such as water or gas meters. Pulses are accumulated in an internal register, and the totalized value is available on the network. This register can be zeroed via the network.

If the auxiliary pulse input option was ordered at the same time the display was ordered, it will arrive fully configured and ready to use. If it was ordered after the display was delivered and is being installed as a field upgrade, it may be necessary to configure the pulse input. The information is provided below and on the following pages:

The input pulse must meet the following criteria:

1. Frequency input range, 50 Hz maximum
2. 10 millisecond minimum pulse duration

Input Pulse Definition:

In order to configure the communications card for an auxiliary input pulse, you must first determine which type of pulse your meter produces. The allowable types of input pulses are described on the following pages. Based on the type of pulse, set the selector switch (S1) on the communications circuit board (Fig. 1) to the correct setting.

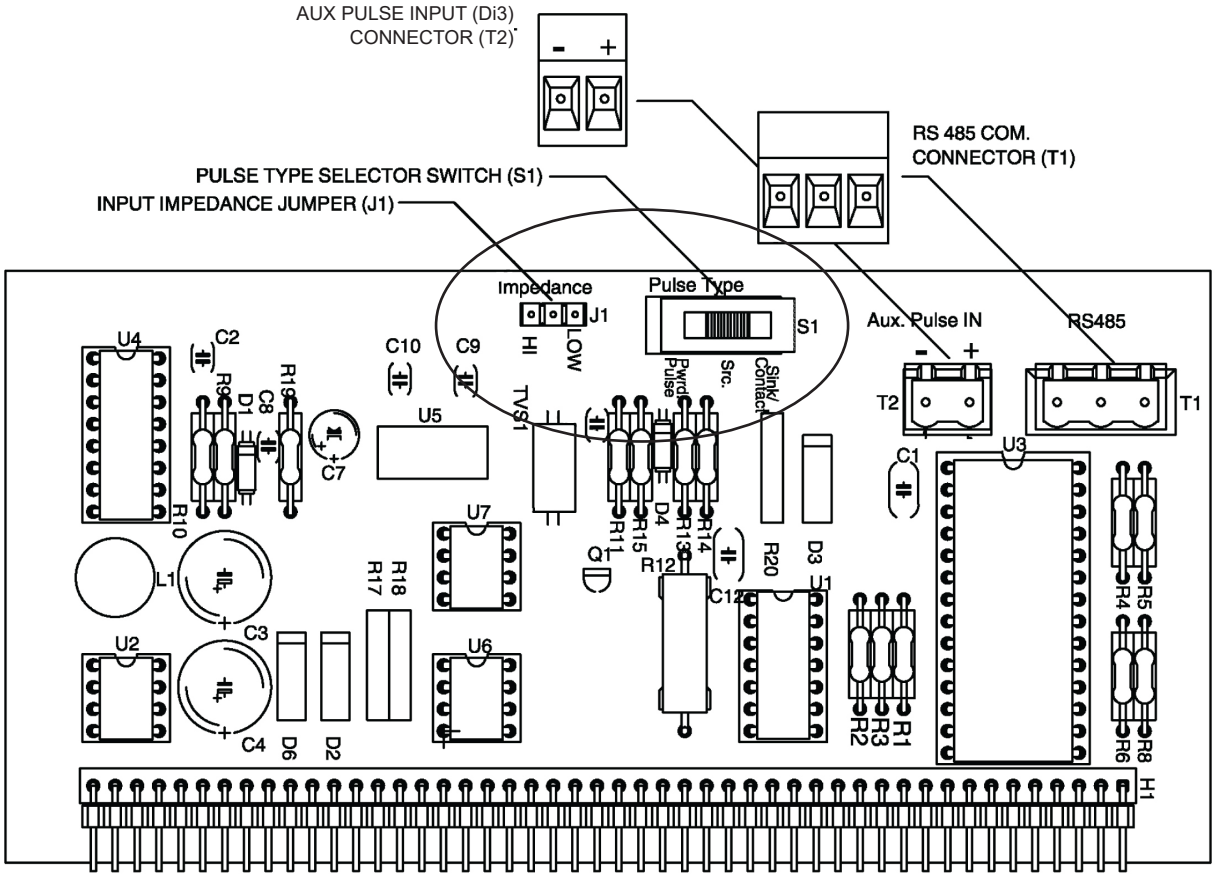


Fig. 1

Powered Pulse:

This type of output refers to a pulse which has an associated voltage with it (see Fig. 2). Set the selector switch, S1 to Pwrd Pulse. The allowable voltage range is 5-24 VDC. The input impedance is set at the factory to be 11 KOHM via the impedance selector jumper (J1, see Fig. 1). A lower impedance, 3 KOHM can be selected if required by the instrument providing the pulse output. Consult the instrument manufacturer or ONICON if you are uncertain as to the proper jumper selection.

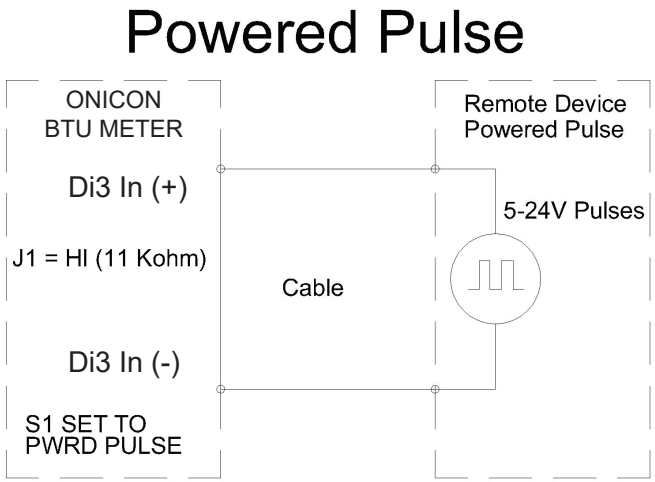


Fig. 2

Open Collector (Sourcing):

This type of output refers to an open Collector Switch configured for a sourcing function (see Fig. 3). Set the selector switch, S1 to SRC. The switch must be rated for at least 20mA at 20VDC.

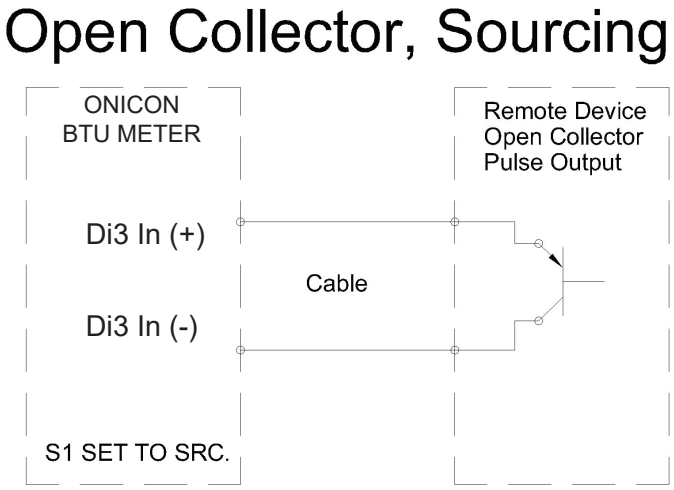


Fig. 3

Open Collector Sinking or Dry Contact:

This type of output refers to an open collector switch configured in a current sinking arrangement or a dry contact switch (see Fig. 4 and 5). Set the selector switch, S1 to Sink. In either case, the switch must be rated for at least 20mA at 20 VDC.

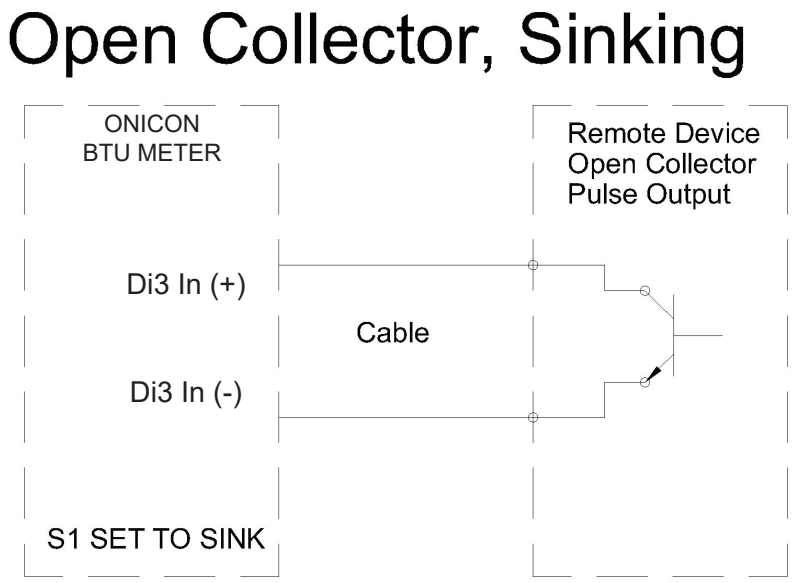


Fig. 4

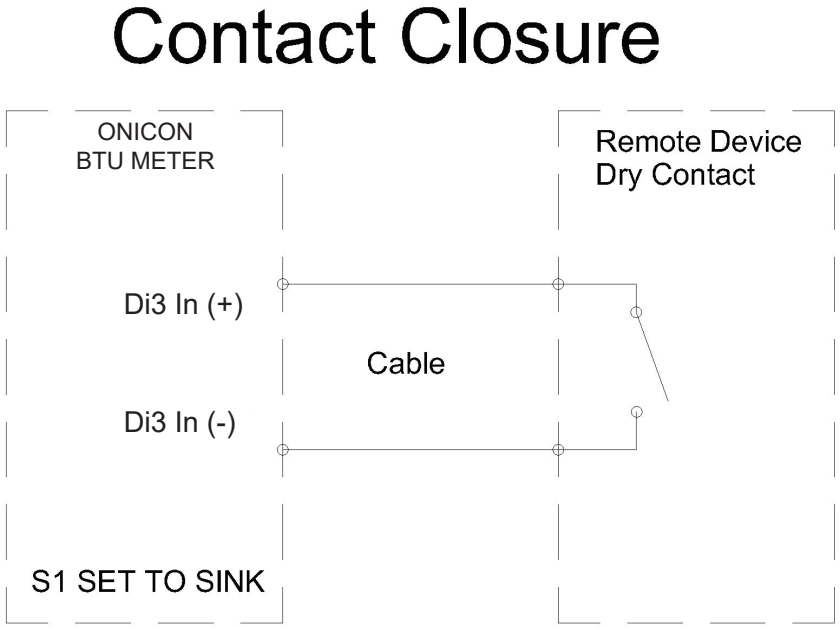
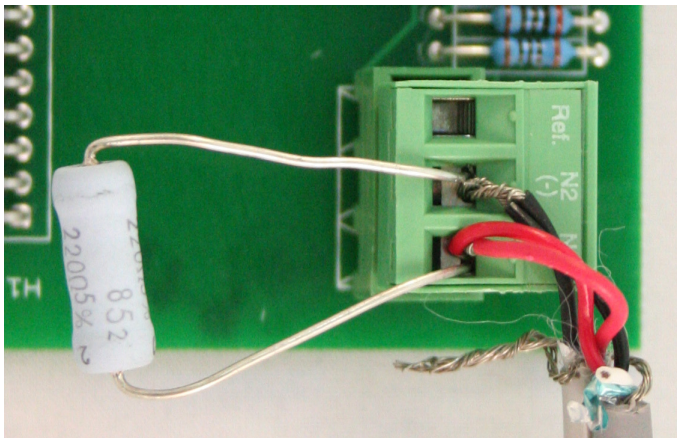


Fig. 5

1.5 RS485 BIASING AND TERMINATION

The ONICON D-100-P1 does not provide biasing voltage or termination to the RS485 network. A 120W termination resistor should be used when the display is installed at the end of the line.



1.6 NETWORK ADDRESSING

Before the D-100 can communicate on the P1 network, the appropriate device address must be programmed into the display. The P1 network address for ONICON D-100 Flow Displays may be set to any address from 1 to 99. This address is set at the display. Section 1.6.1 details the procedure for changing this address.

1.6.1 Changing the Device Address

Every ONICON D-100 is individually programmed at the factory with application specific data provided by the customer during the ordering process, and this may include network addressing information. If the device address information was provided, the display will be programmed with that number. If no address is provided, ONICON displays are programmed with a default address of 017. The address may be changed at the D-100 using the procedure outlined in the table below.

STEP	ACTION	REACTION	COMMENT
0	Obtain a device address from the network administrator.		The device address is a three digit number between 1 - 99, excluding zero.
1	With the display running, open the front panel and locate switch DEV ADD/PROG ENAB. Press DEV ADD/ PROG ENAB and then release it.	None	The DEV ADD/PROG ENAB is located on the processor board. (See appendix page A-1.)
2	Close the front panel.		
3	Press the PROGRAM button. (If you do not press the PROGRAM button, the display will revert to the RUN mode after 5 minutes.)	The D-100 changes to PRO-GRAM mode and the DEVICE ID page will appear with the first digit of the address flashing.	The PROGRAM button is on the front panel.

STEP	ACTION	REACTION	COMMENT
4	Successively press the SCROLL button to increment the number to the desired value from 0-9.	The number increments by one each time you press the button.	The SCROLL button is on the front panel.
5	Press the RESET button.	The second character blinks.	The RESET button is on the front panel.
6	Successively press the SCROLL button to increment the number to the desired value from 0-9.	The number increments by one each time you press the button.	The SCROLL button is on the front panel.
7	Press the RESET button.	The third character blinks.	The RESET button is on the front panel
8	Successively press the SCROLL button to increment the number to the desired value from 0-9.	The number increments by one each time you press the button.	The SCROLL button is on the front panel.
9	Once the correct value has been entered, press PROGRAM.	The FRONT PANEL RESET page appears.	It is not necessary to change anything on this page.
10	Press the PROGRAM button.	The SAVE CHANGES page appears.	The new device address must be saved to take effect.
11	Press the SCROLL button.	The N changes to Y on the SAVE CHANGES page.	The Y must be selected in order for the new address to take effect.
12	Press the PROGRAM button.	The new address is saved and the display reverts to the RUN mode.	
13	Open the front panel and locate the RESET switch. Press to reset the D-100.	When polled, the D-100 will automatically begin to communicate with the network.	RESET is located along the top of the processor board. (See appendix page A-1.)

1.7 ENABLING / DISABLING FRONT PANEL RESET

The D-100-P1 Display accumulates totals in nonvolatile memory. This memory can be zeroed directly at the display or via the network. The direct method requires the operator scroll the LCD display until the total is displayed. The operator must then press the reset button on the front panel. The total reverts to zero. The next total to be zeroed is selected and the process repeated. The front panel reset function, however, must be enabled. It is shipped "Disabled" from the factory. To enable the function, follow the instructions in the table below.

STEP	ACTION	REACTION	COMMENT
1	With the dispaly running, open the front panel and locate S-4. Press S-4.	None	Switching S-4 arms the front pane PROGRAM button for a period of five minutes.
2	Close the front panel.	None	The display remains in the run mode.
3	Press the PROGRAM button.	The top line of the LCD shows eight P characters, PPPPPPPP. The bottom line shows P1 DEVICE ID XX.	XX can be any two number digits. The first digit will blink. Take no action.
4	Press the PROGRAM button.	Top line: PPPPPPPP Bottom line: P1 APP NO XXXX	Take no action.
5	Press the PROGRAM button.	Top line: PPPPPPPP Bottom line: FRONT PANEL RESET N	
6	Press the SCROLL button.	The last N character on the bottom line changes to Y.	RESET N indicated "disabled." RESET Y indicates "enabled."
7	Press the PROGRAM button.	Top line: PPPPPPPP Bottom line: SAVE CHANGES N	
8	Press the SCROLL button.	The N on the bottom line changes to Y. Bottom line: SAVE CHANGES Y	
9	Press the PROGRAM button.	The bottom line disappears. After a moment a run mode page appears.	After a short delay, the display enters its run mode.

1.8 D-100-P1 POINT DATABASE

The Point Database table on the next page lists all of the points used by the D-100-P1 Flow Display. NOTE: Also refer to the Siemens' Application Note, Document No. XXX-XXXX for more information.

1.8.1 Application Number

The application number is assigned to the display based on the calibration parameters supplied at the time the display was programmed. If the system parameters change, please contact ONICON for assistance in determining the correct application number.

TABLE OF STANDARD D-100-P1 APPLICATION NUMBERS									
Siemens Application Number	Point 4		Point 5		Point 6		Points 11 & 12		Date Added
	Displayed Flow Rate		Ai3 Generic Analog Input 1		Ai4 Generic Analog Input 1		Displayed Flow Total		
1001	GPM x	1	NONE x	1	NONE x	1	GALLONS x	10	3/9/2011
1002	GPM x	1	NONE x	1	NONE x	1	GALLONS x	100	3/9/2011
1003	GPM x	1	NONE x	1	NONE x	1	GALLONS x	1,000	3/9/2011
1004	GPM x	1	NONE x	1	NONE x	1	GALLONS x	10,000	3/9/2011
1005	GPM x	10	NONE x	1	NONE x	1	GALLONS x	10,000	3/9/2011
1006	L/S x	1	NONE x	1	NONE x	1	LITERS x	100	3/9/2011
1007	L/S x	1	NONE x	1	NONE x	1	LITERS x	1,000	3/9/2011
1008	L/S x	1	NONE x	1	NONE x	1	LITERS x	10,000	3/9/2011
1009	SCFH x	1	NONE x	1	NONE x	1	SCF x	1	3/9/2011
1010	SCFH x	1	NONE x	1	NONE x	1	SCF x	10	3/9/2011
1011	SCFH x	1	NONE x	1	NONE x	1	SCF x	100	3/9/2011
1012	SCFH x	10	NONE x	1	NONE x	1	SCF x	100	3/9/2011
1013	SCFH x	10	NONE x	1	NONE x	1	SCF x	10,000	3/9/2011
1014	SCFH x	1	NONE x	1	NONE x	1	SCF x	10	3/9/2011
1015	SCFH x	1	NONE x	1	NONE x	1	SCF x	100	3/9/2011
1016	SCFH x	1	NONE x	1	NONE x	1	SCF x	1,000	3/9/2011
1017	SCFH x	1	NONE x	1	NONE x	1	SCF x	10,000	3/9/2011
1018	NCMH x	1	NONE x	1	NONE x	1	NCM x	10	3/9/2011
1019	NCMH x	1	NONE x	1	NONE x	1	NCM x	100	3/9/2011
1020	PPH x	1	NONE x	1	NONE x	1	LBM x	1	3/9/2011
1021	PPH x	1	NONE x	1	NONE x	1	LBM x	10	3/9/2011
1022	PPH x	1	NONE x	1	NONE x	1	LBM x	100	3/9/2011
1023	PPH x	10	NONE x	1	NONE x	1	LBM x	100	3/9/2011
1024	PPH x	10	NONE x	1	NONE x	1	LBM x	1,000	3/9/2011
1025	KPH x	1	NONE x	1	NONE x	1	KG x	1	3/9/2011
1026	KPH x	1	NONE x	1	NONE x	1	KG x	10	3/9/2011
1027	KPH x	1	NONE x	1	NONE x	1	KG x	100	3/9/2011
1028	KPH x	10	NONE x	1	NONE x	1	KG x	100	3/9/2011
1029	KPH x	10	NONE x	1	NONE x	1	KG x	1,000	3/9/2011
1030									
1031									
1032									
1033									
1034									
1035									

1.8.2 D-100-P1 Point Database

P1 POINTS								
Pt	**Name/Range**	**Type**	**Category**	**COV**	**OVR**	**Default**	**Initial**	**Current**
1	Address Range: 1-99	02	LAO	NO	YES	99	11_{H}	None
2	Application	02	LAO	NO	NO	1999_{10}	1999_{10}	None
4	Flow Rate - 0-32,767	03	LAI	YES	NO	0	0	Integer
5	Ai3 - Generic Analog Input 1	03	LAI	YES	NO	0	0	Integer
6	Ai4 - Generic Analog Input 2	03	LAI	YES	NO	0	0	Integer
8	Operating Mode: 1/Forward, 2/Reverse	03	LDI	NO	NO	0	0	Byte
11	W0-M1Volume: 000,000-009,999	03	LAI	NO	NO	0	0	Integer
12	W1-M1 Volume: 010,000-999,999	03	LAI	NO	NO	0	0	Integer
15	W0-M2 Volume: 000,000-009,999	03	LAI	NO	NO	0	0	Integer
16	W1-M2 Volume: 010,000-999,999	03	LAI	NO	NO	0	0	Integer
17	W0-AuxiIn-1: 000,000-009,999	03	LAI	NO	NO	0	0	Integer
18	W1-AuxiIn-2: 010,000-999,999	03	LAI	NO	NO	0	0	Integer
19	Not Used							
20	Point 20, Override Time (Hours) Range 0-FF	02	LAO	NO	YES	1	1	None
22	M-1 V Reset - 0/Off, 1/Reset	01	LDO	NO	YES	0	0	Byte
24	M-2 V Reset - 0/Off, 1/Reset	01	LDO	NO	YES	0	0	Byte
25	AuxIn Reset - 0/Off, 1/Reset	01	LDO	NO	YES	0	0	Byte
29	DAY.NGT ON=Night; OFF=Day; Default=OFF	01	LDO	NO	YES	0	0	Byte
99	ERROR STATUS Bit Oriented	01	LAO	NO	YES	0	0	Integer
100	Point 100 Factory Flag	Factory Flag is not a point in the sense that the others are. It is referenced only by the Memorize Point Command. Other commands should NAK it with “POINT DOES NOT EXIST”.						

NOTE: Also refer to the Siemens’ Application Note, Document No. XXX for additional information.

SECTION 2.0: NETWORK IMPLEMENTATION STRATEGIES

2.1 IMPLEMENTATION STRATEGIES

Monitoring
Several D-100 parameters are available for monitoring purposes. These include Volume Rate (Point 4), Ai3 - Generic Analog Input 1 (Point 5), and Ai4 - Generic Analog Input 2 (Ppoint 6). These points can be unbundled for use in trending the performance of the hydronic system or used in various global control strategies.

Totalization
Three D-100-P1 Display parameters are available for accumulating totalized data. These are Mode 1 Volume Total (Points 11 & 12), Mode 2 Volume Total (Points 15 & 16) and (optional) auxiliary input (Points 17 & 18). Typically the Mode 1 and Mode 2 Volume Total points of the D-100-P1 Display are used to quantify the amount of water consumed in custody transfer applications. They may also be used to accumulate total consumption for use in ongoing plant or system efficiency measurements.

D-100-P1 Display totalization registers are 7 digit registers. User defined units and multipliers are then applied to these values. This is required to allow for the accumulation of totals over a reasonable time period without exceeding the capacity of the reigster. P1 variables are limited in range to 32,767. In order to properly convey the D-100 information, each totalization register is represented by two separate type 3 LAI points. The first point represents digits from 0 - 9,999. The second point represents the digits from 10,000 to 9,999,999. The user-selected multiplier is applied to the units for the first word. For the second point, the multiplier is adjusted by a factor of 10,000, then applied to the units.

Multipliers
ONICON D-100 Volume Rate and Accumulation Points have multipliers. Multipliers are 1, 10, 100, 1,000, 10,000, 100,000 or 1,000,000. For points 11, 12, 15, 16, 17, and 18 the point descriptor will contain the multiplier. The 11 multipliers are as follows:

Characters	Multiplier
1	1
X	10
C	100
K	1,000
XK	10,000
CK	100,000
M	1,000,000
XM	10,000,000
CM	100,000,000
KM	1,000,000,000
XKM	10,000,000,000

Example

The D-100-P1 Display is running Application xxxx. The display shows the Volume Total as 122604 GAL x 100. The associated P1 variables would be as follows:

Point 11 – 2604 CGAL
Point 12 – 12 MGAL
To bring this value into the APOGEE Automation System, assign a Virtual Point for Volume Total:
Volume Total = (Point 11 x 100) GAL+ (Point 12 x 1,000,000) GAL
Volume Total = (2604 x 100) GAL+ (12 x 1,000,000) GAL
Volume Total = 260400 GAL + 12000000 GAL
Volume Total = 12260400 GAL

NOTE: Volume Total to equal ONICON display you must divide the number above by 100 to get GAL x 100. 12260400 / 100 = 122604 GAL x 100

2.2 OTHER FUNCTIONALITY

Each of the following functions of the D-100-P1 Display are also available and may be required, depending on the application.

Mode Status
Mode Status (Point 8) provides a separate indication of flow direction in bi-directional flow applications. For bi-directional flow applications, Mode 1 represents flow in the direction of the arrow on the flow meter enclosure.

Resetting Totals
Separate type 1 LDO points are provided to reset each totalizing register. These are Mode 1 Volume Total Reset (Point 22) Mode 2 volume Total Reset (Point 24, and Auxiliary Input Total Reset (Point 25).

Isolated, Non-polarized Dry Contact Pulse Output
An optional pulse output for the external accumulation of energy increments is available. Pulse durations of 0.5-, 1.0-, 2.0-, or 6-seconds can be selected by the user.

APPENDIX

A-1 D-100 PROCESSOR BOARD

D-100 FLOW DISPLAY PROCESSOR BOARD

