

IntelliBoost

Series 7710

Constant Pressure Variable Speed Booster Systems

Bulletin 7710

- Capacities to 800 G.P.M. (182 M³/HR)
- Pressures to 300 PSI (211 M)
- Potable Water Application



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AURORA[®]
Pentair Water

IntelliBoost Variable Speed Pumping System Introduction

The Aurora Pump IntelliBoost Variable Speed Constant Pressure Booster System is designed to meet the ever-increasing needs and complexity of today's water systems, and is specifically tailored to fresh water applications in high rises, office buildings, hospitals, hotels, and other commercial, industrial and municipal locations. This system offers a state of the art combination of the Pentair Water Variable Frequency Drive for each pump, and a PLC Control Panel with a PID Loop to stage up to four pumps based on pressure and flow needs of the building. Pumps are the Pentair PVM multistage pump with suitable for variable frequency drives. Each system is fully assembled, wired and tested for ease of installation and reliable service.

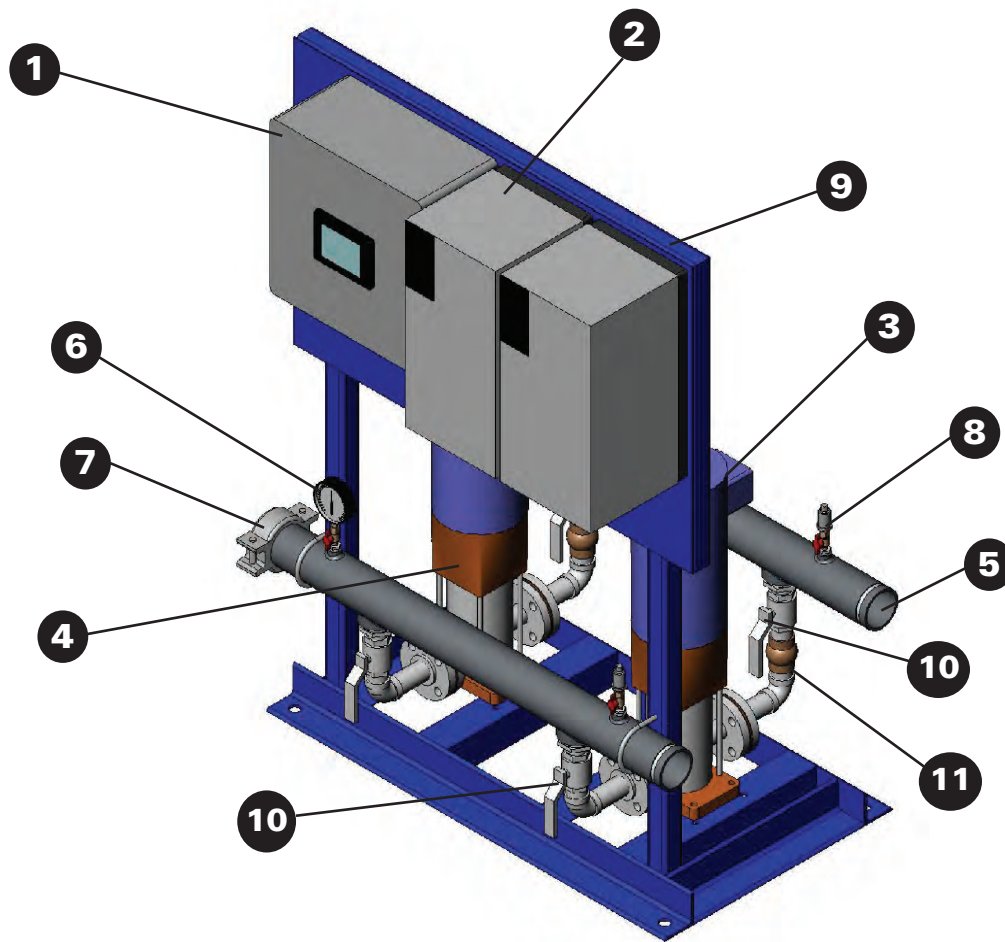
Feature Selector

STANDARD

- UL Listed Control Panel with PLC and Proportional Integral Derivative to sequence pumps
- Duplex, Triplex, Quadraplex
- Pentair PVM multistage pumps
- ANSI pump flanges
- 304 SS manifolds
- Hydrostatic Test
- Isolation Ball Valves and non-slam check valves for each pump
- Boost pressure to 300 PSI, and flows to 800 GPM.
- Single source responsibility
- No flow shut down sleep cycle based on no load and time to shut down
- Audible Visible alarm system
- Suction and Discharge Manifold Gages
- 3.8" Inch Touch Screen HMI for panel operation
- Real Time Clock
- RS-485 Communication to VFD's Modbus RTU
- 460 Volts at 60Hz
- Pressure transducer mounted on discharge manifold to provide 4-20 mA signal

OPTIONAL

- Pressure Transducer mounted on suction manifold to provide 4-20 mA signal
- Low Suction pressure shut down
- Low System pressure alarm
- Temperature Switches in each pump to aid in flow shut down
- Stainless Steel Base assembly
- Common Disconnect with Breaker with single point power feed
- Augment each variable speed drive with a Bypass Starter
- Flow Transducer to operate integrally with pressure control
- 24 Hour Alternation
- NEMA 1, 12, 4X
- Operation on 380 volts 50 Hz
- Single Phase operation available
- Spare EE PROM with standard program
- Gauges at each pump
- Complete Factory Test
- 316 SS manifolds
- Ethernet Communications
- 5.7" Inch Color HMI Touch Screen
- Separately Shipped Hydro-Pneumatic Tank
- Custom Engineered Systems



FEATURES

1. CONTROL PANEL 110 volts single phase with programmable controller and PID Loop
2. PENTAIR WATER VARIABLE SPEED DRIVES with individual disconnects and NEMA 1 enclosure
3. INVERTER Suitable C Faced High Efficiency motors
4. PENTAIR WATER PVM Multi-Stage Pumps
5. 304 SS Schedule 40 Suction and Discharge Manifolds
6. MANIFOLD MOUNTED pressure gauges
7. GROOVED VICTAULIC MANIFOLD CONNECTIONS for coupling or available ANSI Flange
8. GAUGE PRESSURE TRANSDUCER with 1% Accuracy
9. STRUCTURAL STEEL BASE and Manifold Support
10. ISOLATION FULL PORT BALL VALVES for Suction and Discharge of Each Pump
11. SILENT CHECK VALVES Mounted to the Discharge of Each Pump

Pump and System Selection Guide

There are two primary ways of selecting pumps as a system. In the first case, building piping and fittings would be a part of an engineer's calculations so that all losses are calculated back to the pumps. In this case no losses are allowed in the booster system.

In the second and more common case, an engineer calculates all losses back to the packaged system manifolds. Suction pressure is subtracted from discharge pressure to determine the TDH of the system. An allowance is made for package system losses, and is added to the system TDH to get pump TDH.

$$(\text{Total System Flow } ____ \text{ GPM}) / (\text{Number of Pumps } ____) = (\text{Flow per Pump } ____ \text{ GPM})$$

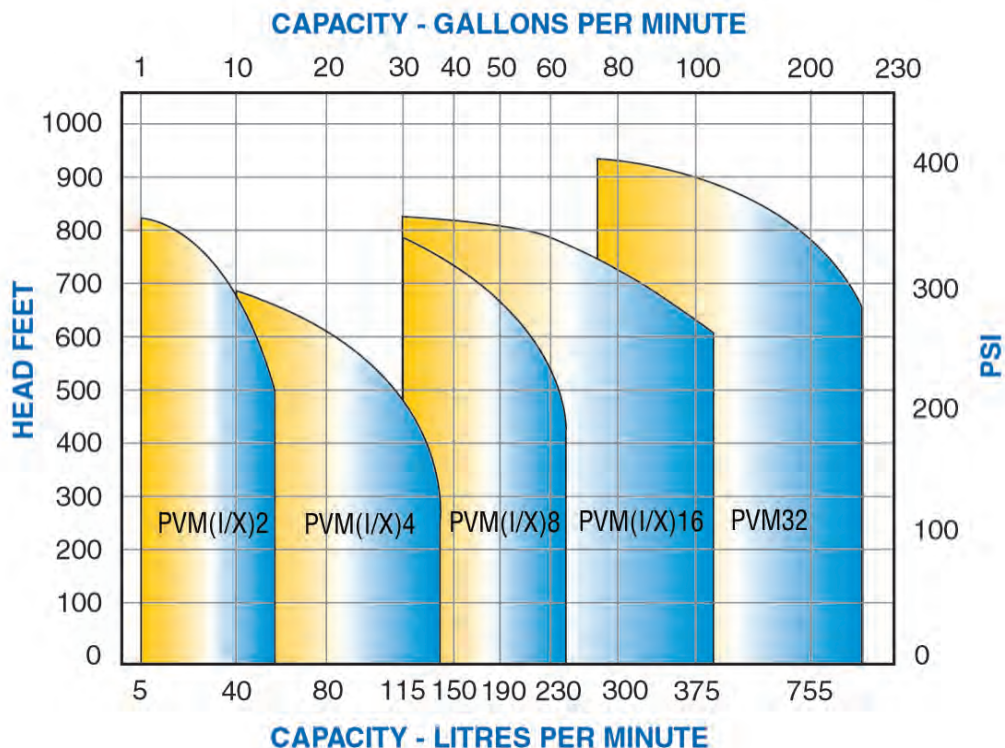
$$(\text{Discharge Pressure } ____ \text{ Feet}) - (\text{Lowest Suction Pressure } ____ \text{ Feet}) = (\text{System Boost } ____ \text{ Feet})$$

$$(\text{System Boost } ____ \text{ Feet}) + (\text{System Friction Loss } \underline{18 \text{ Feet}}) = (\text{Pump Boost } ____ \text{ Feet})$$

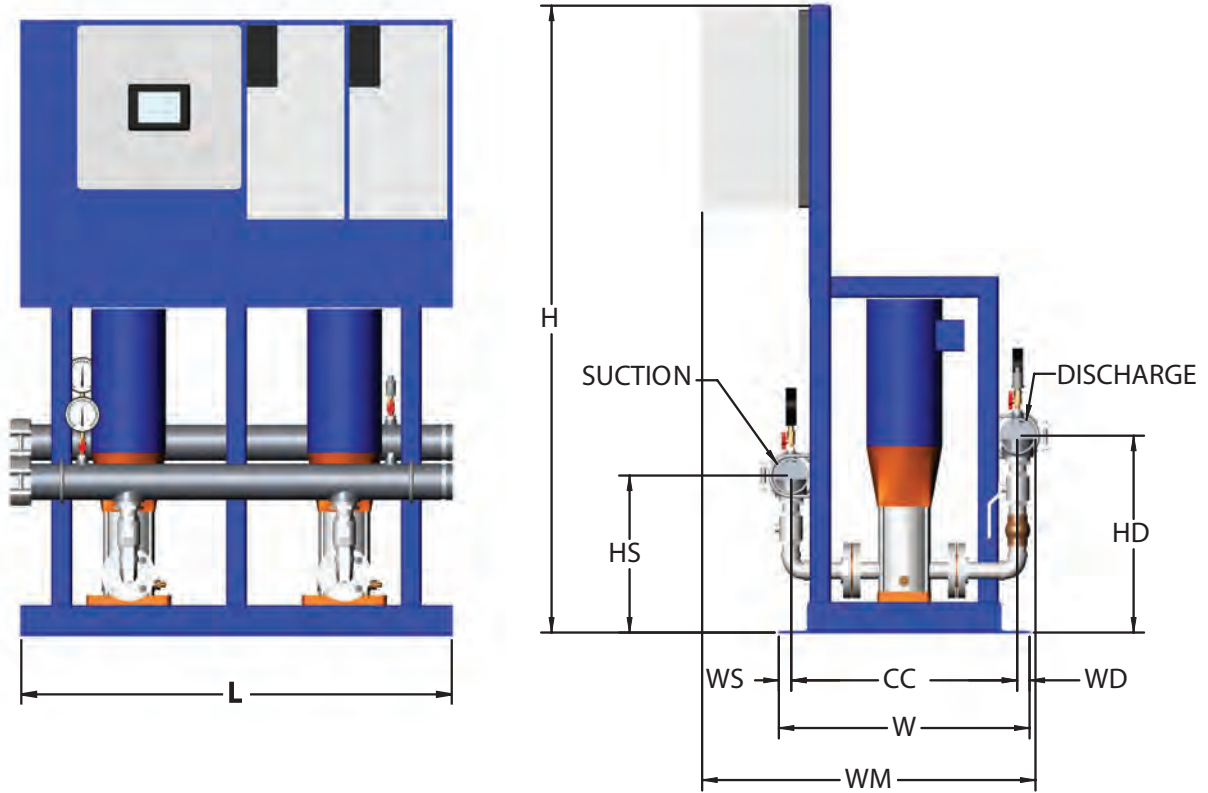
Note: System Loss is taken as 18 feet due to appropriate sizing of piping

From the above calculation the Flow in GPM and the Head in Feet TDH is established for pump selection. Check the Pentair PVM Pump curves or the H₂Optimizer for pump selection.

PVM Pump Range Chart for 60 Hertz



System Dimensions

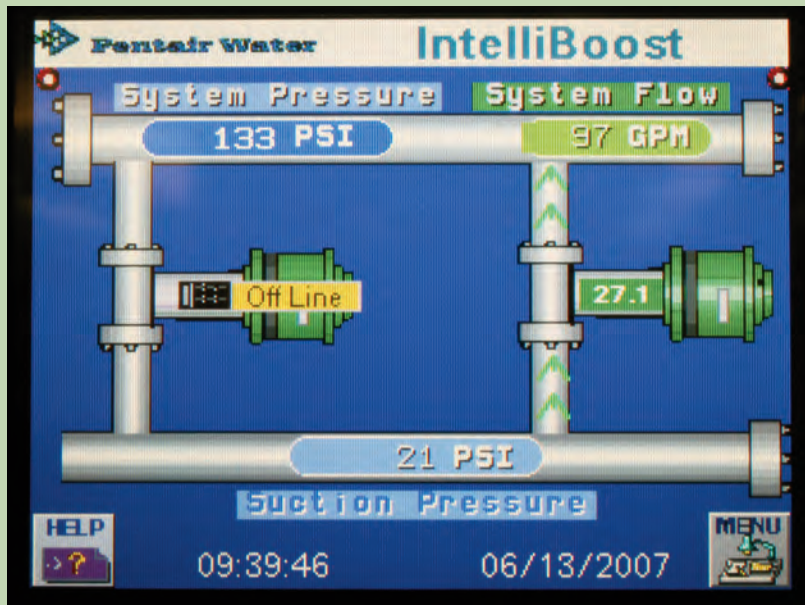


INTELLIBOOST PUMP SERIES	MANIFOLD SIZE	BRANCH SIZE	LENGTH L			WIDTH OF SKID W	WIDTH (MAX) WM	HEIGHT (MAX) H	HEIGHT OF SUCTION HS*	HEIGHT OF DISCHARGE HD*	CENTER TO CENTER CC*	WIDTH TO SUCTION WS*	WIDTH TO DISCHARGE WD*
			DUPLEX	TRIPLEX	QUADRAPLEX								
PVM 2/4	3	1 1/4	42	63	84	24	32	62	17	21	21 1/2	1 1/4	1 1/4
PVM 8/16	3	2	42	63	84	24	33 3/4	62	19	24	21 1/2	1 1/4	1 1/4
PVM 8/16	4	2	42	63	84	24	34 3/4	62	21	26	22 1/2	3/4	3/4
PVM 8/16	6	2	42	63	84	24	36 3/4	62	22	27	24 1/2	1/4	1/4
PVM 32	4	2 1/2	48	72	96	36	48	80 1/2	24	24	35	1/2	1/2
PVM 32	4	3	48	72	96	36	50 3/4	80 1/2	24	31	34 1/2	3/4	3/4
PVM 32	6	2 1/2	48	72	96	36	51 1/2	80 1/2	25	25	37	1/2	1/2
PVM 32	6	3	48	72	96	36	52	80 1/2	25	32	36 1/2	0	1/2

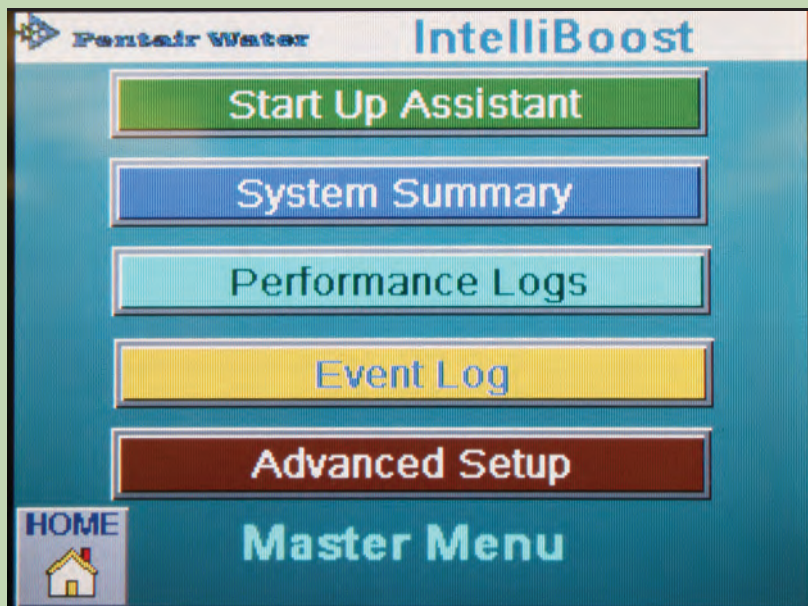
NOTES:

1. ALL DIMENSIONS ARE IN INCHES AND MAY VARY +/- 1/2 UNLESS OTHERWISE NOTED.
2. DUE TO TAPERED THREAD TOLERANCE STACK UP, DIMENSIONS MARKED WITH * MAY VARY +/- 2.
3. NOT FOR CONSTRUCTION UNLESS CERTIFIED.
4. MANIFOLD ENDS ARE STANDARD GROOVED CONNECTIONS.

Status at a glance.



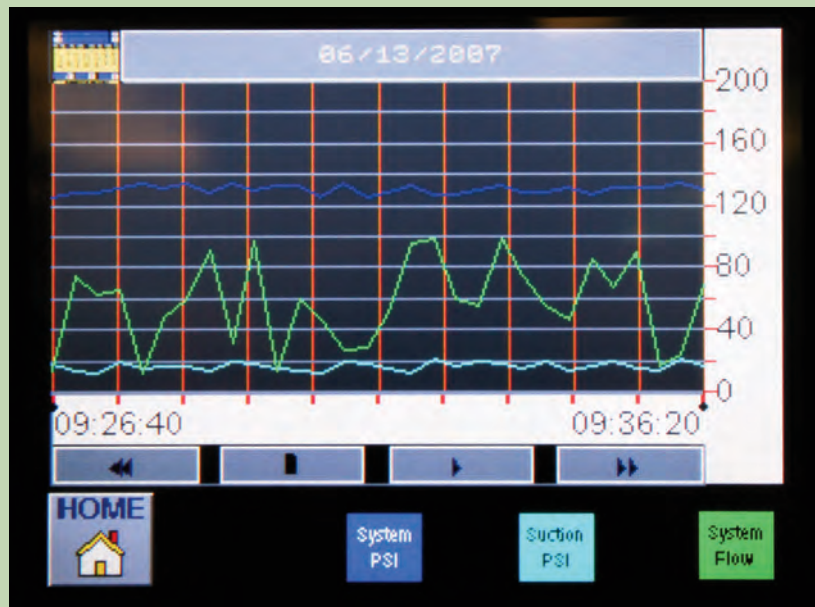
Menu:



Fast and Easy Start-up with the 3.8" inch touch screen control HMI (human machine interface) panel operation.

NOTE: 5.7" Color Screen Illustrated

Performance Log:



The performance log consists of a graph of flow, suction pressure, and discharge pressure, plotted against time, with continuous update in real time. Data is retained for future review. The screen shown is the 5.7" color screen and is in enhance mode.

NOTE: Suction transducer & flow transducer required for respective data display.

Event Log:

The Event Log table displays a list of VFD 1 Fault events. The table has four columns: Message, State, and Time. The events are color-coded by state: ACTIVE (red), ACK (yellow), and RTN (green). The table includes navigation icons at the top and bottom, and an ESC button at the top right.

Message	State	Time
VFD 1 Fault	ACTIVE	08:22:44
VFD 1 Fault	ACK	08:28:10
VFD 1 Fault	RTN	08:39:11
VFD 1 Fault	ACTIVE	12:42:07
VFD 1 Fault	RTN	12:42:23

A memory is retained of each alarm & fault with identity status and time of occurrence.

NOTE: The screen shown is the 5.7" color enhanced screen.

The contractor shall furnish and install a constant pressure, variable speed (duplex, triplex, quadraplex) Booster System as manufactured by Aurora Pump Company. The system shall have a total system flow of ___GPM and a discharge head of ___feet when supplied with a suction pressure of ___feet. Each pump will have flow and head equal to the other pumps. The total system flow will be equal to the combination of all active pumps except where a standby pump of equal size is added.

System Flow ___ GPM

System Boost ___ Feet

Pump # 1 ___ GPM ___ Feet TDH

Pump # 2 ___ GPM ___ Feet TDH

Pump # 3 ___ GPM ___ Feet TDH

Pump # 4 ___ GPM ___ Feet TDH

PIPING AND VALVES

Each System shall consist of a structural steel base capable of being grouted, and a structural framework to support both piping and control panels. All piping will consist of 304 stainless steel Schedule 40 pipe welded, threaded, flanged or grooved coupled, with isolation full port ball valves and non-slam check valve for each pump, with grooved v-taualic manifold connections for ease of assembly. 3 1/2" stem mounted gauges with isolation valves are to be supplied on each manifold.

PUMPS

Pumps shall be Pentair Water PVM multistage pumps with stainless steel impellers, diffuser, shaft, and 250-pound flanges. Seals are to be of tungsten carbide against tungsten carbide, EPDM Elastomer, and SS metals.

MOTORS

Motors are to be standard efficiency suitable for Inverter ready, Open Drip Proof, 3500 RPM, 3 Ph, 60 Hz, Nema T frame, C face with upgraded thrust bearing. Motors are selected to be non-overloading at all points on the pump curve.

CONTROL PANEL-PRESSURE SENSING

Each system control will consist of a Control Panel, NEMA 4 enclosure, with Programmable Logic Controller (PLC) and Proportional Integral Derivative (PID) Loop, programmed to stage all pumps as needed for variable flow and constant pressure. The PLC will respond to a 4-20 ma signal from a pressure transducer located on the discharge manifold. Each pump will have a Pentair Variable Frequency Drive. Both PLC and Variable Frequency Drives will be designed with user-friendly program, accessible to customer for further compatibility to local system conditions. Standard features of this control are as follows:

- Drive Shut Down after set time with no load (Sleep Mode)
- Audible Visible Alarm System with Silence
- Real Time Clock
- 3.8" inch Touch Screen Control HMI (human machine interface)
- RS-485 Communication to VFD's Modbus
- 24 Hour Alternation
- Nema 1 drive enclosed

Optional Features:

- Low Suction Pressure Shut Down
- High System Pressure Alarm
- Suction Pressure Transducer to enhance low suction pressure shut down feature
- Temperature Switches to aid in no-flow shut down
- Stainless Steel Base
- Common Disconnect and Single Point Power Feed
- Augment Variable Frequency Drives with Bypass Starters
- Flow Transducer to supply 4-20 mA flow signal to Control Panel and Flow display
- NEMA 1, 12, 4X
- Operation on 380V, 50Hz
- Single phase operation
- Spare EE PROM with standard program
- Gauges for each pump

- Complete System Test
- 5.7 inch Color Display Touch Screen HMI
- Ethernet Communications
- Separately Mounted Hydro-Pneumatic Tank

VARIABLE SPEED DRIVES

Variable Speed Drives shall be Pentair Variable Frequency Drives with pulse width modulation, microprocessor based algorithm, using insulated gate bipolar transistors (IGBT), with NEMA 1 enclosure, disconnect with fuses. Circuit breakers are not allowed. Variable speed drives are to be slaves to the master control panel with PID loop. In the event of master control panel failure, drives are to be individually capable of being operated in variable speed mode. Software features shall be as follows:

- **AEO**--An Automatic Energy Optimization selection feature shall optimize motor magnetization, and dynamically adjust output voltage to load, independent of speed.
- **Empty Pipe Fill**--Empty Pipe Fill mode shall fill an empty pipe in a short period of time and then revert back to PID control operation. Program time shall reduce fill time and reduce water hammer in the system.
- **Dry Pump Protection and Shut Down**-- will be available.

NOTE: Aurora Pump reserves the right to make revisions to its products and their specifications, and to this bulletin and related information, without notice.

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