



# Water Temperature Control - Recirculation Systems



## Digital

Water Temperature Control - Digital features Digital Recirculation Valves (DRV) and Digital Mixing Centers (DMC) specifically designed for use in a continuously pumped recirculating hot water system.

### Options

#### The Brain® - Digital Recirculation Valve

Model DRV25 is a Digital Recirculation Valve (DRV) designed for systems which experience diverse draw-off between 0 - 19 GPM\* and is provided with 1" connections.

Model DRV40 is a Digital Recirculation Valve (DRV) designed for systems which experience diverse draw-off between 0 - 41 GPM\* and is provided with 1.5" connections.

Model DRV50 is a Digital Recirculation Valve (DRV) designed for systems which experience diverse draw-off between 0 - 73 GPM\*. DRV50 is a model DRV80 provided with bushed down 2" connections.

Model DRV80 is a Digital Recirculation Valve (DRV) designed for systems which experience diverse draw-off between 0 - 165 GPM\* and is provided with 3" connections.

#### The Brain® - Digital Recirculation Valve with Recirculation Manifold

Model DRV25R - As above with integral recirculation system return manifold assembly with 1" connections.

Model DRV40R - As above with integral recirculation system return manifold assembly with 1.5" connections.

Model DRV50R - As above with integral recirculation system return manifold assembly with 2" connections.

Model DRV80R - As above with integral recirculation system return manifold assembly with 3" connections.

#### The Brain® - Digital Mixing Centers (DMC) Flex

Model DMC25 Flex is a DRV25 pre-piped with isolation valves, strainers, check valves and a recirculation manifold with unistrut supports. DMC25 Flex is designed for systems which experience diverse draw-off between 0 - 19 GPM\* and is provided with 1" connections.

Model DMC40 Flex is a DRV40 pre-piped with isolation valves, strainers, check valves and a recirculation manifold with unistrut supports. DMC40 Flex is designed for systems which experience diverse draw-off between 0 - 41 GPM\* and is provided with 1.5" connections.

Model DMC50 Flex is a DRV50 pre-piped with isolation valves, strainers, check valves and a recirculation manifold with unistrut supports. DMC50 Flex is designed for systems which experience diverse draw-off between 0 - 73 GPM\* and is provided with 2" connections.

Model DMC80 Flex is a DRV80 pre-piped with isolation valves, strainers, check valves and a recirculation manifold with unistrut supports. DMC80 Flex is designed for systems which experience diverse draw-off between 0 - 165 GPM\* and is provided with 3" connections.

#### The Brain® - Digital Mixing Centers (DMC)

Model DMC25-25 is a Digital Mixing Center pre-piped with a DRV25, isolation valves, strainers, check valves, temperature gauges, pressure gauges, control panel, and integral recirculation piping mounted on an enameled steel frame. DMC25-25 is configured for redundant service at 0 - 19 GPM\*, or full-flow service at 0 - 41\* GPM with 1.5" connections.

Model DMC40 is a Digital Mixing Center pre-piped with a DRV40, isolation valves, strainers, check valves, temperature gauges, pressure gauges, control panel, and integral recirculation piping mounted on an enameled steel frame. DMC40 is designed for systems which experience diverse draw-off between 0 - 41 GPM\* with 1.5" connections.

Model DMC40-40 is a Digital Mixing Center pre-piped with two DRV40, isolation valves, strainers, check valves, temperature gauges, pressure gauges, control panel, and integral recirculation piping mounted on an enameled steel frame. DMC40-40 is configured for redundant service at 0 - 41 GPM\*, or full-flow service at 0 - 115\* GPM with 2.5" connections.

Model DMC50 is a Digital Mixing Center pre-piped with a DRV50, isolation valves, strainers, check valves, temperature gauges, pressure gauges, control panel, and integral recirculation piping mounted on an enameled steel frame. DMC50 is designed for systems which experience diverse draw-off between 0 - 73 GPM\* with 2" connections.

Model DMC50-50 is a Digital Mixing Center pre-piped with two DRV50, isolation valves, strainers, check valves, temperature gauges, pressure gauges, control panel, and integral recirculation piping mounted on an enameled steel frame. DMC50-50 is configured for redundant service at 0 - 73 GPM\*, or full-flow service at 0 - 165\* GPM with 3" connections.

Model DMC80 is a Digital Mixing Center pre-piped with a DRV80, isolation valves, strainers, check valves, temperature gauges, pressure gauges, control panel, and integral recirculation piping mounted on an enameled steel frame. DMC80 is designed for systems which experience diverse draw-off between 0 - 165 GPM\* with 3" connections.

Model DMC80-80 is a Digital Mixing Center pre-piped with two DRV80, isolation valves, strainers, check valves, temperature gauges, pressure gauges, control panel, and integral recirculation piping mounted on an enameled steel frame. DMC80-80 is configured for redundant service at 0 - 165 GPM\*, or full-flow service at 0 - 294\* GPM with 4" connections.

Model DMC80-80-80 is a Digital Mixing Center pre-piped with three DRV80, isolation valves, strainers, check valves, temperature gauges, pressure gauges, control panel, and integral recirculation piping mounted on an enameled steel frame. DMC80-80-80 is configured for redundant service at 0 - 294 GPM\*, or full-flow service at 0 - 459\* GPM with 5" connections.

\* Note: Flow capacities indicated at 7.5 ft/sec pipeline velocity.





# Water Temperature Control - Recirculation Systems



## Digital

### The Brain® Model DRV25

DRV25 Digital Recirculation Valve (DRV) designed specifically to be the primary water temperature controller in a continuously pumped circulating hot water system

Digital technology provides enhanced water temperature control accuracy which resists zero system demand "Temperature Creep" without the use of a manual throttling valve or a temperature activated pump shut-off device (aquastat). Also capable of zoned system control with or without recirculation.

Completely integral digital valve with no need for external or ancillary components such as actuators, sensors or controllers

### Operational Specifications (DRV25)

- Ready to go out of the box or field adjustable via Bluetooth connectivity with the SAGE® mobile app
- $\pm 2^{\circ}\text{F}$  DRV water temperature control at peak, moderate or zero fixture demand on hot water system designed for continuous recirculation
- $1^{\circ}\text{F}$  minimum recirculating water temperature differential
- Programmable set point range of  $81\text{--}158^{\circ}\text{F}$  ( $27\text{--}70^{\circ}\text{C}$ ) capable of BAS or SAGE® mobile app for monitoring and adjustment
- Programmable thermal disinfection range of  $158\text{--}185^{\circ}\text{F}$  ( $70\text{--}85^{\circ}\text{C}$ )
- Automatic safe closure of hot water inlet in response to: inlet supply failure, 110V power failure, or programmable high temperature error
- Automatic safe closure of hot water inlet powered by a replaceable lithium battery monitored for low-level alerting

### Technical Specifications

- 100-240V AC
- Polymer Electronics Enclosure
- Stainless Steel Valve Construction
- Lead Free compliant
- Maximum inlet HW supply temperature  $185^{\circ}\text{F}$  ( $85^{\circ}\text{C}$ );  $131^{\circ}\text{F}$  ( $55^{\circ}\text{C}$ ) during Group Control
- Minimum Continuous Recirculation - 2 GPM ( $\frac{8}{3}$  LPM)
- Minimum System Draw Off - 0 GPM; 2 GPM ( $\frac{8}{3}$  LPM) during Group Control
- Conforms to ASSE 1017, CSA B125.11, UL E357437, and CE
- Operational water pressure of 10-200 psig (7-133 barg)
- Bluetooth (BLE) enabled for direct communication with the DRV25 via the SAGE® mobile app status dashboard and programming
- Shipping weight 6.8 lbs (3.1 kg)

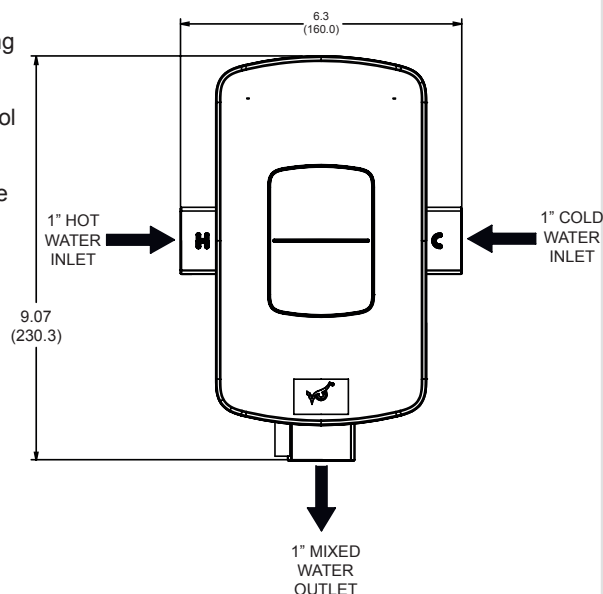
### Connectivity

RS485 Serial Port – Integral MODBUS RTU for direct connectivity to BAS  
Seamless integration with SAGE® (BS) connectivity options

SAGE® mobile app allows for Bluetooth® (BLE) communications with the DRV25, and SAGE® to Cloud communications if optional mobile connectivity subscription is activated.

See DRV25BS for SAGE® (BS) module available with specific ProtoCessor cards for BAS Connectivity to systems which operate on Modbus TCP, BACnet™, or LonWorks™ protocols. Mobile Connectivity may be enabled by a customer activated no-term subscription

Mobile Connectivity features smart hot water system dashboard monitoring, secure remote programming, multi-location view, temperature and system diagnostic alerts, with unlimited digital documentation and automated report generation.



For a submittal drawing, refer to D112404

#### Recirculation Systems - Digital (GPM and PSIG)

Model DRV25	Pressure Drop (PSIG)				Minimum System Draw-Off	$C_v$
	5	10	15	20		
GPM	22	31	39	45	0	9.8

#### Recirculation Systems - Digital (LPM and BARG)

Model DRV25	Pressure Drop (BARG)				Minimum System Draw-Off	$K_v$
	0.3	0.7	1.0	1.4		
LPM	81	118	145	171	0	8.5





# Water Temperature Control - Recirculation Systems



## Digital

### The Brain® Model DRV40

DRV40 Digital Recirculation Valve (DRV) designed specifically to be the primary water temperature controller in a continuously pumped circulating hot water system.

Digital technology provides enhanced water temperature control accuracy which resists zero system demand "Temperature Creep" without the use of a manual throttling valve or a temperature activated pump shut-off device (aquastat)

### Operational Specifications

- +/-2°F DRV water temperature control at peak, moderate or zero fixture demand on hot water system designed for continuous recirculation
- 1°F minimum recirculating water temperature differential
- LCD display which indicates: set point, delivered temperature, error codes and alarm conditions capable of BAS and mobile connectivity
- Programmable set point range of 81-158°F (27-70°C) capable of BAS or mobile monitoring and adjustment
- Programmable thermal disinfection range of 158-185°F (70-85°C)
- Programmable 1st level hi/lo temp alarm display capable of BAS or mobile alerting
- Automatic safe closure of hot water inlet in response to: inlet supply failure, 110V power failure, or programmable high temperature error
- Automatic safe closure of hot water inlet powered by a replaceable lithium battery monitored for low-level alerting

### Technical Specifications

- 100-240V AC
- Polymer Electronics Enclosure
- Stainless Steel Valve Construction
- Lead Free compliant
- Maximum inlet HW supply temperature 185°F (85°C)
- Minimum Continuous Recirculation - 5 GPM (19 LPM)
- Minimum System Draw Off - 0 GPM
- Conforms to ASSE 1017, CSA B125.11, UL E357437, and CE
- Operational water pressure of 10-200 psig (7-13 barg)
- Display in °C or °F
- Shipping weight 15 lbs (68 kg)
- Integral MODBUS RTU for direct connectivity to BAS, or SAGE®

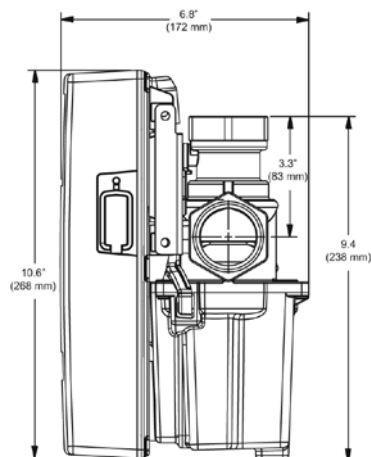
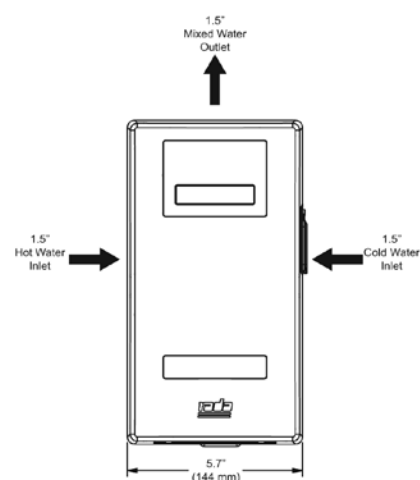
### Connectivity

RS485 Serial Port – Integral MODBUS RTU for direct connectivity to BAS  
Seamless integration with SAGE® (BS) connectivity options

See DRV40BS for SAGE® (BS) module available with specific ProtoCessor cards for BAS Connectivity to systems which operate on Modbus TCP, BACnet™, or LonWorks™ protocols. Mobile Connectivity may be enabled by a customer activated no-term subscription.

Mobile Connectivity features smart hot water system dashboard monitoring, secure remote programming, multi-location view, temperature and system diagnostic alerts, with unlimited digital documentation and automated report generation.

For a submittal drawing, refer to D41578



#### Recirculation Systems - Digital (GPM and PSIG)

Model DRV40	Pressure Drop (PSIG)				Minimum System Draw-Off	C <sub>v</sub>
	5	10	15	20		
GPM	48	70	85	98	0	22

#### Recirculation Systems - Digital (LPM and BARG)

Model DRV40	Pressure Drop (BARG)				Minimum System Draw-Off	C <sub>v</sub>
	0.3	0.7	1.0	1.4		
LPM	181.7	265.0	321.8	371.0	0	22





# Water Temperature Control - Recirculation Systems



## Digital

### The Brain® Model DRV50

DRV50 Digital Recirculation Valve (DRV) designed specifically to be the primary water temperature controller in a continuously pumped circulating hot water system.

Digital technology provides enhanced water temperature control accuracy which resists zero system demand "Temperature Creep" without the use of a manual throttling valve or a temperature activated pump shut-off device (aquastat)

### Operational Specifications

- +/-2°F DRV water temperature control at peak, moderate or zero fixture demand on hot water system designed for continuous recirculation
- 1°F minimum recirculating water temperature differential
- LCD display which indicates: set point, delivered temperature, error codes and alarm conditions capable of BAS and mobile connectivity
- Programmable set point range of 81-158°F (27-70°C) capable of BAS or mobile monitoring and adjustment
- Programmable thermal disinfection range of 158-185°F (70-85°C)
- Programmable 1st level hi/lo temp alarm display capable of BAS or mobile alerting
- Automatic safe closure of hot water inlet in response to: inlet supply failure, 110V power failure, or programmable high temperature error
- Automatic safe closure of hot water inlet powered by a replaceable lithium battery monitored for low-level alerting

### Technical Specifications

- 100-240V AC
- Polymer Electronics Enclosure
- Stainless Steel Valve Construction
- Lead Free compliant
- Maximum inlet HW supply temperature 185°F (85°C)
- Minimum Continuous Recirculation - 10 GPM (38 LPM)
- Minimum System Draw Off - 0 GPM
- Conforms to ASSE 1017, CSA B125.1, UL E357437, and CE
- Operational water pressure of 10-200 psig (7-13 barg)
- Display in °C or °F
- Shipping weight 23 lbs (10 kg)
- Integral MODBUS RTU for direct connectivity to BAS, or SAGE®

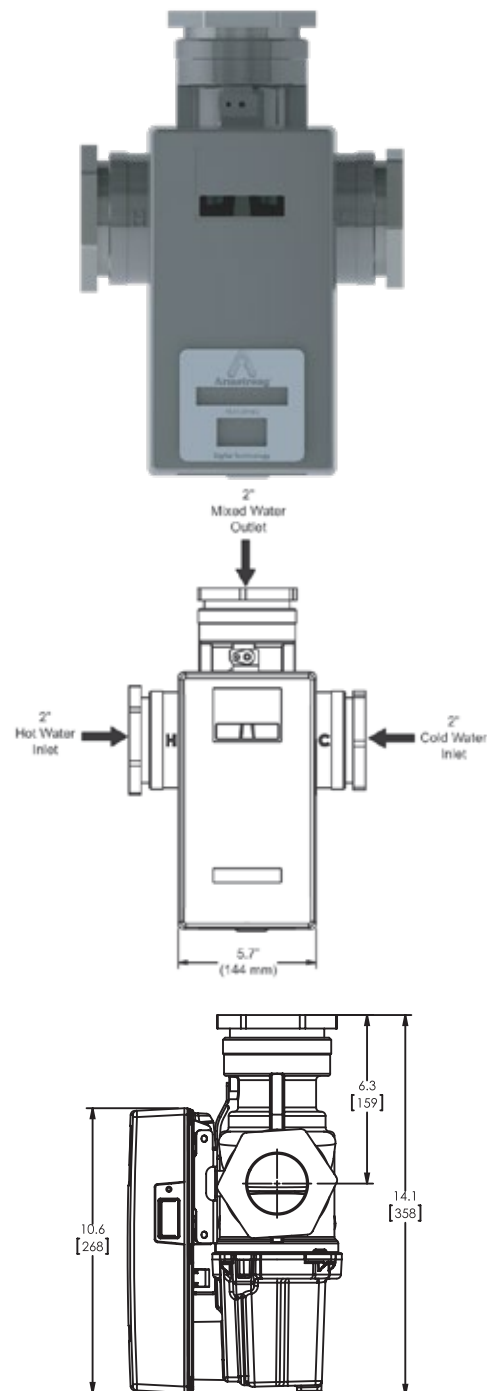
### Connectivity

RS485 Serial Port – Integral MODBUS RTU for direct connectivity to BAS  
Seamless integration with SAGE®(BS) connectivity options

See DRV50BS for SAGE® (BS) module available with specific ProtoCessor cards for BAS Connectivity to systems which operate on Modbus TCP, BACnet™, or LonWorks™ protocols. Mobile Connectivity may be enabled by a customer activated no-term subscription

Mobile Connectivity features smart hot water system dashboard monitoring, secure remote programming, multi-location view, temperature and system diagnostic alerts, with unlimited digital documentation and automated report generation.

For a submittal drawing, refer to D40864.



Recirculation Systems - Digital (GPM and PSIG)						
Model DRV50	Pressure Drop (PSIG)				Minimum System Draw-Off	C <sub>v</sub>
	5	10	15	20		
GPM	94	133	163	188	0	42

Recirculation Systems - Digital (LPM and BARG)						
Model DRV50	Pressure Drop (BARG)				Minimum System Draw-Off	C <sub>v</sub>
	0.3	0.7	1.0	1.4		
LPM	355.8	503.5	617.0	711.7	0	42





# Water Temperature Control - Recirculation Systems



## Digital

### The Brain® Model DRV80

DRV80 Digital Recirculation Valve (DRV) designed specifically to be the primary water temperature controller in a continuously pumped circulating hot water system.

Digital technology provides enhanced water temperature control accuracy which resists zero system demand "Temperature Creep" without the use of a manual throttling valve or a temperature activated pump shut-off device (aquastat)

### Operational Specifications

- $\pm 2^{\circ}\text{F}$  DRV water temperature control at peak, moderate or zero fixture demand on hot water system designed for continuous recirculation
- $1^{\circ}\text{F}$  minimum recirculating water temperature differential
- LCD display which indicates: set point, delivered temperature, error codes and alarm conditions capable of BAS and mobile connectivity
- Programmable set point range of  $81\text{--}158^{\circ}\text{F}$  ( $27\text{--}70^{\circ}\text{C}$ ) capable of BAS or mobile monitoring and adjustment
- Programmable thermal disinfection range of  $158\text{--}185^{\circ}\text{F}$  ( $70\text{--}85^{\circ}\text{C}$ )
- Programmable 1st level hi/lo temp alarm display capable of BAS or mobile alerting
- Automatic safe closure of hot water inlet in response to: inlet supply failure, 110V power failure, or programmable high temperature error
- Automatic safe closure of hot water inlet powered by a replaceable lithium battery monitored for low-level alerting

### Technical Specifications

- 100-240V AC
- Polymer Electronics Enclosure
- Stainless Steel Valve Construction
- Lead Free compliant
- Maximum inlet HW supply temperature  $185^{\circ}\text{F}$  ( $85^{\circ}\text{C}$ )
- Minimum Continuous Recirculation - 10 GPM (38 LPM)
- Minimum System Draw Off - 0 GPM
- Conforms to ASSE 1017, CSA B125.11, UL E357437, and CE
- Operational water pressure of 10-200 psig (7-13 barg)
- Display in  $^{\circ}\text{C}$  or  $^{\circ}\text{F}$
- Shipping weight 43 lbs (195 kg)
- Integral MODBUS RTU for direct connectivity to BAS, or SAGE®

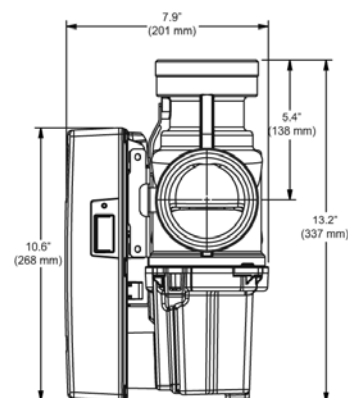
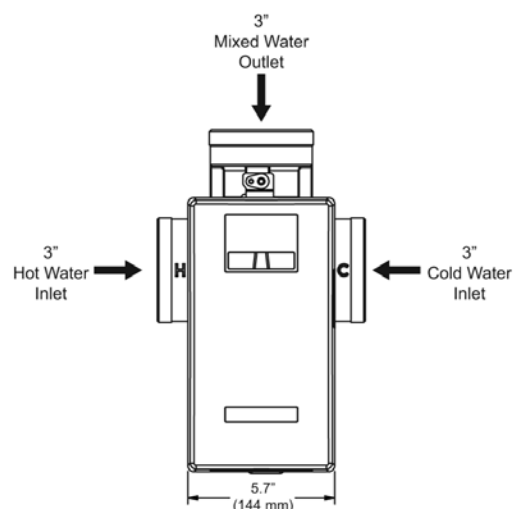
### Connectivity

RS485 Serial Port – Integral MODBUS RTU for direct connectivity to BAS  
Seamless integration with SAGE® (BS) connectivity options

See DRV80BS for SAGE® (BS) module available with specific ProtoCessor cards for BAS Connectivity to systems which operate on Modbus TCP, BACnet™, or LonWorks™ protocols. Mobile Connectivity may be enabled by a customer activated no-term subscription.

Mobile Connectivity features smart hot water system dashboard monitoring, secure remote programming, multi-location view, temperature and system diagnostic alerts, with unlimited digital documentation and automated report generation.

For a submittal drawing, refer to D41579



Recirculation Systems - Digital (GPM and PSIG)						
Model DRV80	Pressure Drop (PSIG)				Minimum System Draw-Off	$C_v$
	5	10	15	20		
GPM	94	133	163	188	0	42

Recirculation Systems - Digital (LPM and BARG)						
Model DRV80	Pressure Drop (BARG)				Minimum System Draw-Off	$C_v$
	0.3	0.7	1.0	1.4		
LPM	355.8	503.5	617.0	711.7	0	42





## Connectivity



### THE BRAIN® AND SAGE®

SAGE® works seamlessly with The Brain® as it analyzes data to track behavior and performance as an integral component of a hot water system operation protocol which complies with a Standard of Care.

The Brain™ and every derivative assembly is supplied with an integral RS485 serial port. This port provides a direct connection to Building Automation Systems which operate on a Modbus RTU protocol.

The RS485 port is also deployed for direct connection to an optionally supplied Building System (BS) Module.

### SAGE® Options

SAGE® for Building Automation Systems (BAS) – BS Module available with BAS specific ProtoCessor cards for connection to systems which operate on Modbus TCP, BACnet™ or LonWorks™ protocols.

SAGE® for Mobile Connectivity - Featuring smart hot water system dashboard monitoring, secure remote programming, multi-location view, temperature and system diagnostic alerts, with unlimited digital documentation and automated report generation.

Mobile connectivity may be enabled by a customer activated no-term subscription.



### Optional Building System (BS) Module

Adding a suffix BS to any Brain DRV or DMC model number in this brochure (example DRV80R-BS) will automatically add SAGE®, the supplemental hardware and software required to maximize the connectivity features of Armstrong digital technology.

