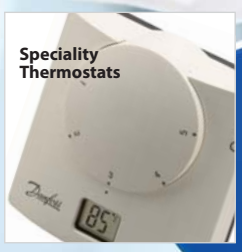
MAKING MODERN LIVING POSSIBLE



Danfoss Hydronic Comfort Controls

CATALOG

HD.CAT.2012

- Thermostatic Radiator Valves and Operators
- Electric Valve Actuators
- Electric Zone Valves
- Thermostatic Heating / Cooling Controllers
- Thermostats for Hydronic Systems, Floor Heating and HVAC
- Balancing Valves
- Thermostatic and Motorized Mixing Valves
- Solid Fuel and Solar Controls
- Snow Melt Control System
- Hydronic Specialities
- Spare Parts and Accessories

RA 2000

RA 2000 thermostatic operators provide automatic temperature control for free standing radiators, baseboards or convectors in hot water and low temperature steam systems. Valve bodies sold separately.

RA 2000 Operators	Code No.	Description		Required Valve Body	Master Carton Qty.
	**013G8250**	**RA 2000 Valve Mounted Dial and Sensor.** Snap action mechanism allows for easy installation and removal without the use of tools.		RA 2000	60 pcs.
	**013G8252**	**RA 2000 Valve Mounted Dial with Remote Sensor.** Snap action mechanism allows for easy installation and removal without the use of tools. 6′ Capillary Tube.			45 pcs.
	**013G8240**	**RA 2000 Tamper Resistant Valve Mounted Dial and Sensor.** Set screw mount.			48 pcs.
	**013G2922**	**RA 2000 Tamper Resistant Valve Mounted Dial with Remote Sensor.** Set screw mount. 6′ Capillary Tube.			45 pcs.
	**013G8562 ***	**RA 2000 Wall Mount Operator with combined Remote Mounted Sensor and Dial.**	6′ (1.8 m) Capillary		24 pcs.
	013G8565 *		16′ (4.9 m) Capillary		
	013G8568 *		26′ (7.9 m) Capillary		
	**013G8564 ***	**RA 2000 Operator with Separate Remote Mounted Sensor and Dial.** 2 X 6′ Capillary Tubes.			20 pcs.
	**013G5002**	**RA 2000 Manual Adjustment Handle.** Allows use as a manual hand valve. Hot Water Only.			150 pcs.
	**013G1350**	**Angle Adaptor** For use only on Hot Water Systems			N/A

* Includes socket for use on RAV, KOVM and VMT valve bodies

RA and RAV to RA 2000 Operator Replacement Guide - See Page 52

For more information on TRV's, visit our website: www.radiatorcontrol.com

For spare parts and accessories see pages: 34 - 45
For RA 2000 valve bodies, see page: 8

RAVV, RAVK, FTC

RAVV is a self-acting thermostatic element used to control temperatures in small hot water storage tanks and to regulate flow to air heating coils. RAVV closes on rising sensor temperature.

RAVV	Code No.	Description			Capillary Length
		Type	Temperature Range	Required Valve Body	
	013U1251	Thermostatic	104° - 158°F (40° - 70°C)	VMT	5 ft. (1.5 m)
	013U1252		80° - 132°F (27° - 57°C)		
	013U1255		50° - 100°F (10° - 38°C)		
	017-4370	½" Brass Sensor Well for RAVV and RAVK			

RAVK is a self-acting thermostatic element used to control temperatures in small hot-water cylinders (i.e. storage tanks) or heat exchangers in radiator heating systems. RAVK closes on rising sensor temperature.

RAVK	Code No.	Description			Capillary Length
		Type	Temperature Range	Required Valve Body	
	013U8063	Thermostatic	77° - 149°F (25° - 65°C)	VMT (065F0102 or 065F0104) or KOVM	6'6" (2 m)
	017-4370	½" Brass Sensor Well for RAVV and RAVK			

FTC is a self-acting thermostatic sensor used for flow temperature control of floor heating and radiator heating systems. The water temperature is measured by a surface sensor, which is easily mounted on the pipe by means of a strip (enclosed with the product). The snap-lock connector of the sensor element secures a firm connection to the valve. Closes on rising sensor temperature. Maximum ambient temp. 150° F (65° C). Maximum flow temp. 250° F (120° C). Capillary tube length 0 to 6.5' (0 to 2.0 m).

FTC	Code No.	Description			Master Carton Qty.
		Type	Temperature Range	Required Valve Body	
	013G5081	Self Acting Thermostatic Operator c/w 6'6" (2 m) capillary and strap on sensor. Celsius temperature scale on dial.	59° - 122°F (15° - 50°C)	RA 2000 or RA-C	20 pcs.
	013G5080		95° - 158°F (35° - 70°C)		

For spare parts and accessories see pages: 34 - 45

TWA-A, TWA-V, ABRA, ABNM

TWA actuators are used to electrically activate valves on hot water heating systems, where slow opening and closing is desirable to eliminate water hammer associated with quick acting valves.

TWA-A	Code No.	Description			Master Carton Qty.
		Type	Model	Required Valve Body	
	**088H3110**	NC	**TWA-A** Actuator 24VAC 2.0 VA c/w valve position indicator.	RA 2000	60 pcs.
	088H3111	NO			
	088H3114	NC 4 Wire with end switch	**TWA-A** Actuator 24VAC 2.0 VA c/w valve position indicator.		

TWA-V	Code No.	Description			Master Carton Qty.
		Type	Model	Required Valve Body	
	**088H3120**	NC	**TWA-V** Actuator 24VAC 2.0 VA	VMT (065F0102 or 065F0104 only)	60 pcs.
	088H3121	NO			

ABRA actuators are used to electrically activate valves on hot water heating and low pressure steam systems, where slow opening and closing is desirable to eliminate water hammer associated with quick acting valves.

ABRA	Code No.	Description			Master Carton Qty.
		Type	Model	Required Valve Body	
	**082F1085**	NC 4 wire with end switch	**ABRA** Actuator 24VAC 2.0 VA	RA 2000	10 pcs.

See page 7 for adaptor rings

ABNM modulating valve actuators are used in direct digital controlled (DDC) systems with 0-10 V DC control voltage. The ABNM design offers precision regulation, long life, silent operation and full valve modulation. Utilized on hot water and low pressure steam systems.

ABNM	Code No.	Description			Master Carton Qty.
		Type	Model	Required Valve Body	
	**082F1091**	NC	**ABNM** Actuator (requires 0 -10 VDC signal) 24VAC 1.5 VA	RA 2000	60 pcs.

See page 7 for adaptor rings

For spare parts and accessories see pages: 34 - 45

For more information on TRV's, visit our website: www.radiatorcontrol.com

ADAPTOR RINGS, ABV

ABRA/ABNM ADAPTOR RINGS
These assemblies can be used as replacements to older Danfoss OEM ABNA thermo actuators or as a replacement to other manufacturers' manifold or valves.

Code No.	Description
VA33	Uponor manifold
VA50H	Honeywell Braukmann
VA54H	MMA, Macon
VA64	RTI (Pettinaroli) manifold
VA78	Danfoss RA2000
VA80H	Heimeier, Overtrop (since 1997), TACO (Alpha actuator, since 2005), Embassy manifold

ABV is a thermo-hydraulic actuator for two point control used to control floor temperature, floor heating systems, hot-water service systems, zone valves and district heating systems. Adjustable flow limitation and manual operation. Maximum ambient temperature 140°F (60°C).

ABV	Code No.	Description		
		Type	Model	Required Valve Body
	**082F0002**	NO	**ABV** Actuator 24VAC 9.0 VA	VMT or KOVM
	082F0052	NC		

For spare parts and accessories see pages: 34 - 45

RA 2000, Valve Insert

RA 2000 valve bodies are designed to meet the demands of the residential, commercial and industrial sectors.

RA 2000	Code No.	Description					Master Carton Qty.
		Connection			Design	Application	
		Size	Type	Cv			
	**013G8013**	1/2″	FPT x MPT Union Tailpiece	1.6	Side Mount Angle	Water or 2 Pipe Low Pressure Steam	24 pcs.
	013G8018	3/4″		2.1			
	013G8023	1″		2.8			18 pcs.
	013G8030	1-1/4″		2.8			
	**013G8015**	1/2″		1.6	Straight		24 pcs.
	013G8020	3/4″		2.7			
	013G8025	1″		2.8			18 pcs.
	013G8032	1-1/4″		2.8			
	**013G8014**	1/2″		1.6	Angle		24 pcs.
	013G8019	3/4″		2.7			
	013G8024	1″		2.8			18 pcs.
	013G8031	1-1/4″		2.8			
	**013G8042**	1/2″	Solder Union	1.6	Straight	2 Pipe Hot Water	35 pcs.
	013G8044	3/4″		2.7			
	**013G0140**	1/8″	NPT	NA	1 Pipe Steam with Vacuum Breaker	1 Pipe Steam	30 pcs.
	**013L8011**	1/8″	NPT	NA	Air Vent for 013G0140	1 Pipe Steam	N/A

Danfoss Radiator Valve Insert for Dunham-Bush SWRF-B ¾″ Valve

The **Danfoss Valve Insert Conversion Kit** is specifically designed for the modification of the Dunham-Bush SWRF-B ¾″ valve body. With this conversion kit, room temperature control through a thermostatic operator can be utilized to bring added comfort and reduced overheating within the room.

	Code No.	Description
	**013G8074**	Danfoss valve insert conversion specifically for Dunham-Bush SWRF-B, ¾″ valve body

For spare parts and accessories see pages: 34 - 45

For more information on TRV's, visit our website: www.radiatorcontrol.com

RA 2000, Conversion Valve, Tailpieces

RA 2000 1-Pipe Steam Radiator to Hot Water Conversion Valve is a special conversion valve that allows a single connection point to serve as both the supply and return for a hot water based system. One such application of the conversion valve is the transition of a cast iron 1-pipe steam radiator to hot water. With the conversion valve the system piping can be transformed to a conventional one pipe hot water (diverter) or two pipe hot water system. Tailpieces and unions are required when installing.

Conversion Valve	Code No.**	Size	Description			
			Connection		Cv	Design
			System	Radiator		
	**013G3270**	1/2"	Rp 1/2 int. thread	R 1/2	2.34*	RA15/6T with internal bypass
	013G3268		G 3/4 ext. thread			
	013G3215		Rp 1/2 int. thread		1.17	RA15/6TB without internal bypass

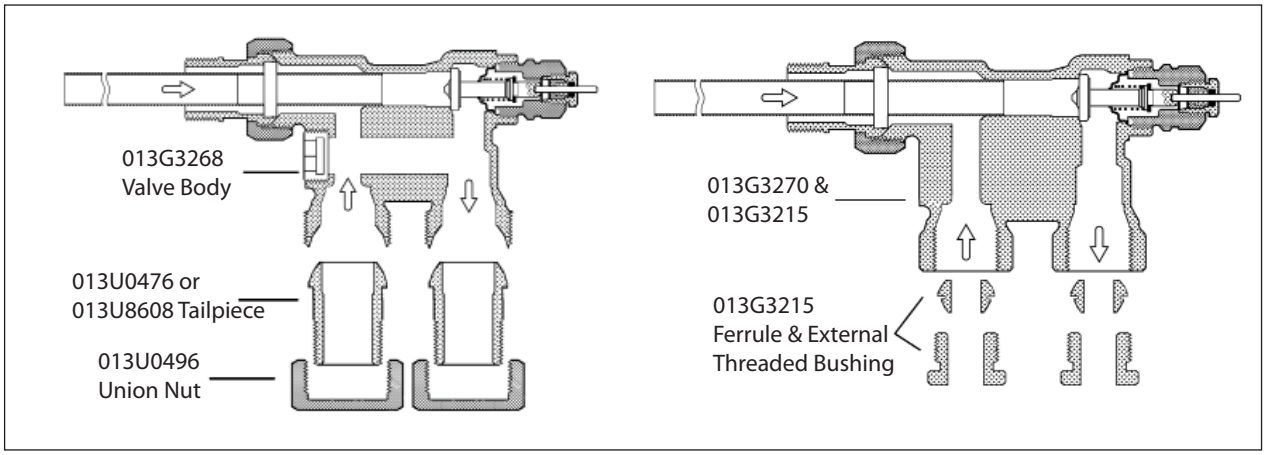
*C_v = C_v bypass + C_v radiator. Max flow through radiator, approx. 35%.

** Required Tailpieces ordered Separately

Required Tailpieces for Conversion Valve

Required Fitting	Code No.	Description
	**013G4116**	1/2" Copper compression fitting for RA15/6T & TB, 2 pcs required, use with 013G3215 & 013G3270 only
	**013U0476**	1/2" M. NPT tailpiece for RA15/6TB, 2 pcs required, use with 013G3268 only
	**013U8608**	1/2" F. solder tailpiece for RA15/6TB, 2 pcs required, use with 013G3268 only
	**013U0496**	1/2" Union nut for RA15/6TB, 2 pcs required, use with 013G3268 only

For application reference, please see the images below.



VMT, RA-C, KOVM, VTA

VMT is a 2-way seated valve, used primarily for heating systems. The valve can be combined with thermostatic element RAVV, ABV, TWA-V or RA 2000 wall mount operators.

VMT	Code No.	Description				
		Connection		Cv	Design	Application
		Size	Type			
	**065F0102**	1/2"	Solder	1.8	Straight Union	RAVV, ABV, TWA-V*, RA 2000 Wall Mount Operators
	065F0104	3/4"		2.7		
	065F8960	1/2"		3.3		
	065F8961	3/4"		5.9		
	065F1242	1"	NPT (M)	9.4		

*(065F0102 or 065F0104 only).

RA-C valves, together with Danfoss self-acting and electronic controllers, make up a perfect combination for control of cooling and heating circuits. RA-C is a normally open valve. In an application with FEK or FED controllers, RA-C valves open when room temperature rises above set point. The RA-C valves have four possible pre-settings, ensuring the correct water flow to each circuit.

RA-C	Code No.	Conn. Size	Presettings: Cv Value				Water Temp.	Master Carton Qty.
			1	2	3	N		
	**013G3094**	1/2"	0.35	0.64	0.88	1.05	50° - 248°F (10° - 120°C)	75 pcs.
	013G3096	3/4"	0.94	1.29	1.99	3.04		48 pcs.
	**013U0496**	1/2"	Nut					
	013U8608		Tailpiece - Female Solder					
	013U0476		Tailpiece - Male Threaded					
	013U0499	3/4"	Nut					
	013U8609		Tailpiece - Female Solder					
	013U0479		Tailpiece - Male Threaded					

Note: Separate nut and tailpiece (threaded or solder) required (2 sets per valve).

KOVM mixing valve bodies are designed to maintain room temperature by controlling hot (or chilled) water flow through radiators, fans, convectors, etc. Due to the KOVM's unique bypass design, a constant system flow is achieved regardless of the room's heating (or cooling) requirements, therefore system pressures and flow rates are automatically kept constant without the need for pressure controlled bypass valves. (Not suitable for diverting applications)

KOVM	Code No.	Connection			Design	For use with
		Size	Type	Cv		
	**013U3017**	1/2"	NPT	1.75	3 Way Heating or Cooling Mixing Valve	RAVK, RA 2000 (013G8564)
	013U301501		Comp.			
	013U302001			2.34		

ESBE VTA 570 3-way Thermostatic Valve

VTA 570 is a 3-way thermostatic valve that can be utilized as a mixing or diverting application for hydronic closed looped systems. Typically, this thermostatic control is used as a non-electric alternative for a 2-pipe changeover diverting application. This 3-way valve is a replacement to the KOVC Thermostatic valve

VTA 570	Code No.	Design
	**31700100**	¾" union body, 3-way thermostatic valve capable of applications involving either for mixing or diverting, settable range 50 - 86°F (10 - 30°C)
	065B8892	¾" solder union tailpieces

For spare parts and accessories see pages: 34 - 45

ZONE VALVE PACKS

Zone Valve Packs are a cost effective and convenient way to meet your zone valve requirements. Basic and Deluxe Packs include both actuator and valve body in one package. Deluxe Packs also include RETB thermostat.

TWA Basic	Code No.	Connection			Description
		Size	Type	Cv	
	**TWA4200**	1/2"	Solder	1.6	088H3114 24V actuator with end switch. 013G8042 -1/2" solder union valve.
	TWA4400	3/4"		2.7	088H3114 24V actuator with end switch. 013G8044 -3/4" solder union valve.

TWA Deluxe	Code No.	Connection			Description
		Size	Type	Cv	
	**TWA42RETB**	1/2"	Solder	1.6	088H3114 24V actuator with end switch. 013G8042 -1/2" solder union valve. 087N7251 RETB thermostat.
	TWA44RETB	3/4"		2.7	088H3114 24V actuator with end switch. 013G8044 -3/4" solder union valve. 087N7251 RETB thermostat.

ABRA Basic	Code No.	Connection			Description
		Size	Type	Cv	
	**ABRA4200**	1/2"	Solder	1.6	082F1085 24V actuator with end switch. 013G8042 -1/2" solder union valve.
	ABRA4400	3/4"		2.7	082F1085 24V actuator with end switch. 013G8044 -3/4" solder union valve.

ABRA Deluxe	Code No.	Connection			Description
		Size	Type	Cv	
	**ABRA42RETB**	1/2"	Solder	1.6	082F1085 24V actuator with end switch. 013G8042 -1/2" solder union valve. 087N7251 RETB thermostat.
	ABRA44RETB	3/4"		2.7	082F1085 24V actuator with end switch. 013G8044 -3/4" solder union valve. 087N7251 RETB thermostat.

For spare parts and accessories see pages: 34 - 45

THERMOSTATIC HEATING / COOLING CONTROLS

FEK cooling controllers are designed for applications where control of a cooling circuit is required. When room temperature rises above the set temperature the FEK sensor opens the cooling valve. FEK controllers can be used for chilled ceilings, fan coils and induction units. For cooling circuits in fan coils and induction units use the FEK-FF with remote sensor. By placing the sensor in the air inlet a quicker reaction time of the air temperature changes is achieved.

FEK	Code No.	Type	Application	Sensor	Capillary Length	Setting Range	Required Valve Body
	**013G5465**	FEK-IF	Control of Cooling Circuit	Integrated	16 ft. (5 m)	63° to 80°F (17° to 27°C)	RA-C
	**013G5464**	FEK-FF		Remote	6 + 6 ft. (2 + 2 m)		

FEV proportional controllers open or close the heating valve as a function of the temperature deviation. FEV-IF controllers are designed for systems with ceiling, floor or radiator heating. The operator with integrated sensor should be mounted on an internal wall at a height of approx. 5 ft. (1.5 m) in such a way that room temperature can be measured accurately. FEV-FF controllers are designed for fan coil or induction unit applications. By placing the remote sensor in the room air inlet of the unit a quicker response time to temperature changes can be achieved which will result in a more accurate temperature control.

FEV	Code No.	Type	Application	Sensor	Capillary Length	Setting Range	Required Valve Body
	**013G5467**	FEV-IF	Control of Heating Circuit	Integrated	16 ft. (5 m)	63° to 80°F (17° to 27°C)	RA 2000 or RA-C
	**013G5466**	FEV-FF		Remote	6 + 6 ft. (2 + 2 m)		

FED sequential controllers are used in applications in which a cooling and a heating circuit is to be controlled by one controller. Both FED-IF and FED-FF can be applied to chilled ceilings, fan coils and induction units. For control of fan coil and induction units use the FED-FF with remote sensor. By placing the sensor in the air inlet a quicker reaction time of the air temperature changes is achieved.

FED	Code No.	Type	Application	Sensor	Capillary Length	Setting Range	Required Valve Body
	**013G5463**	FED-IF	Sequence Control of Cooling and Heating Circuit	Integrated	13 + 36 ft. (4 + 11 m)	63° to 80°F (17° to 27°C)	Cooling Circuit : RA-C Heating Circuit: RA 2000
	**013G5462**	FED-FF		Remote	6 + 6 + 6 ft. (2 + 2 + 2 m)		Cooling Circuit : RA-C Heating Circuit: RA 2000 or RA-C

For spare parts and accessories see pages: 34 - 45

FHV-R, FHV-A

FHV regulating valves provide temperature control of individual under-floor heated rooms and systems using floor heating in conjunction with radiators.

FHV-R provides temperature control of under floor heating circuits, using a return temperature limiting valve fitted with a type FJVR sensor element. FHV-R is used in applications where a desired floor temperature is required (e.g. a bathroom where a constant warm floor is preferred regardless of room temperature to ensure comfort and to quickly dry water on the floor). Set includes wall enclosure box, front cover, bleed key and valve (return temperature limiter) with air vent. An FJVR sensor is required for controlling the return temperature. Also required are two union nuts and tailpieces per control. When the FHV-R is used for controlling floor heating, the heated floor area should not be more than 100 sq.ft. (10 m2).

FHV-R	Code No.	Model	Description
	**003L1000**	FHV-R	Floor Temperature Control
	**013U0496**	For FHV-R controls. Order two nuts and two tailpieces per control.	1/2" Union Nut
	013U8608		1/2" Solder Female Tailpiece
	013U0476		1/2" Male Threaded Tailpiece
	**003L1040**	FJVR	Return Temperature Limiter Sensor. Setting range: 50° - 122°F (10° - 50°C)
	003L1070		Return Temperature Limiter Sensor. Setting range: 50° - 176°F (10° - 80°C)

FHV-A enables room temperature control via a pre-settable thermostatic valve fitted with a type RA 2000 sensor element. Set includes wall enclosure box, front cover, bleed key and pre-settable valve with air vent. A type RA 2000 sensor element is required for controlling the room temperature. Also required are two union nuts and tailpieces per control.
NOTE: If using the FHV-A for room temperature control, the flow temperature should not be permitted to exceed the maximum recommended by the flooring manufacturer.

FHV-A	Code No.	Model	Description
	**003L1001**	FHV-A	Room Temperature Valve
	**013U0496**	For FHV-R controls. Order two nuts and two tailpieces per control.	1/2" Union Nut
	013U8608		1/2" Solder Female Tailpiece
	013U0476		1/2" Male Threaded Tailpiece
	**013G8250**	RA 2000	Room Temperature Operator

For spare parts and accessories see pages: 34 - 45

RMT, RET, RET B

RMT mechanical room thermostats are for use on 24V heating systems. Built-in ambient temperature sensor.

RMT	Code No.	Model No.	Operating Voltage	Switching Voltage	Scale	Night Set Back	Master Carton Qty.
	**087N119601**	RMT-24	24 VAC	24 VAC	°F	No	N/A
	087N1196	RMT-24			°C	No	
	087N1195	RMT-24R			°C	Yes External timer required	

RET electronic thermostats incorporate an anticipator heater to improve thermal performance. Built-in ambient temperature sensor. LED status indicator.

RET	Code No.	Model No.	Operating Voltage	Switching Voltage	Scale	Night Set Back	Master Carton Qty.
	**087N7014**	RET 24	24 VAC	24 VAC	°C	No	10 pcs.
	087N7015	RET 24-U			°F		
	087N7016	RET 24VF		Dry Contacts for up to 24 VAC	°C		
	087N7017	RET 24VF-U			°F		
	087N7018	RET 24NSB			°C	Yes External timer required	
	087N7019	RET 24NSB-U			°F		

RET B micro-processor controlled room thermostats combine the benefits of a conventional analogue setting knob and an LCD display to show temperature and thermostat status. RET B provides accurate electronic temperature control without the need for an external power supply. Built-in ambient sensor. Suitable for heating or cooling systems. Low battery indicator.

RET B	Code No.	Model No.	Power Supply	Switching Voltage	Scale	Auto/ Off Switch	Night Set Back	Master Carton Qty.
	**087N7251**	RET B	2 x AA Batteries (included)	Dry Contacts for 10 - 24 VAC	°F or °C	No	No	10 pcs.
	087N7255	RET B-LS				Yes	No	
	087N7259	RET B-NSB				No	Yes External timer required	

Please fax/email orders to:
416-352-5981/Custservlx@danfoss.com

For technical assistance call:
Toll Free: 866-375-HVAC (4822)

PROGRAMMABLE HEATING THERMOSTATS

TP7000 programmable room thermostats offer full functionality and a slim, stylish enclosure with a large easy to read LCD display. For increased comfort and energy efficiency, the TP7000 incorporates an optional Optimum Start Controller, which allows the TP7000 to calculate the latest possible time at which the heating system can be turned on so as to achieve the programmed temperature at the programmed time. A chrono-proportional control feature ensures optimum comfort with minimal fuel consumption.

TP7000	Code No.	Model No.	Power Supply	Stages	Sensor	Control Type	Operation	Events per Day
	**087N7400**	TP7000	2 x AA Alkaline Batteries (included)	1 H	Built-in	On/Off or Chrono-Proportional (3 / 6 cycles per hour)	Selectable 7-day or 5/2 day	Up to 6
	087N7401	TP7000A			Remote (included)			

Accessories	Code No.	Model No.	Description
	**087N7285**	TS2/2	Remote room sensor, can be used with all models. Can be used as averaging sensors (2, 3 or 4 sensors)

MTC, MTD - HYDRONIC FLOOR HEATING THERMOSTATS

MTC and MTD Microline® electronic thermostats offer an elegant design. The thermostats are available with floor sensor or with built-in air sensor. 16 Amp switch rating for 120 V and 240 V versions. 24V Models are "dry" contact thermostats.

MTC	Code No.	Scale	Voltage (AC)	Sensor
	**MTC-1991-UFH**	°F	240V	Floor 10 ft. (3 m)
	MTC-2991-UFH		120V	
	MTC-39914-UF		24V	
	MTC-1991-UCH	°C	240V	
	MTC-2991-UCH		120V	
	MTC-39914-UC		24V	
	**MTC-1999-UFH**	°F	240V	Built-in Ambient Air Room Sensor
	MTC-2999-UFH		120V	
	MTC-39994-UF		24V	
	MTC-1999-UCH	°C	240V	
	MTC-2999-UCH		120V	
	MTC-39994-UC		24V	

MTD	Code No.	Scale	Voltage (AC)	Sensor
	**MTD-1999-UFH**	°F	240V	Built-in Ambient Air Room Sensor and Floor Sensor 10 ft. (3m)
	MTD-2999-UFH		120V	
	MTD-39994-UF		24V	
	MTD-1999-UCH	°C	240V	
	MTD-2999-UCH		120V	
	MTD-39994-UC		24V	

Accessories	Code No.	Description
	**ETF-144/99A**	Replacement Floor Sensor

FH - HYDRONIC FLOOR HEATING THERMOSTATS

FH room thermostats are designed to provide single room temperature control in Hydronic floor heating systems.

FH	Code No.	Type	Power Supply	Switching Voltage	Scale	Temperature Range	Night Setback	Floor Sensor
	**088H0024**	FH - WS	24 VAC	24 VAC	° C	6° to 30°C	Manual (Automatic is possible with external timer - not supplied).	Optional
	088H0034				° F	50° to 86°F		

Floor Sensor for FH	Code No.	Type	Description
	**088H0025**	FH - WS	Floor Sensor for FH-WS thermostats. When installed, provides minimum or maximum regulation of floor temperature. 10 ft (3 m). NTC 30 kohm 77°F / 25°C

SNOW MELTING SYSTEM CONTROLLER AND SENSORS

ETS controller provides electronic on/off control for ground snow melting or gutter/ downspout snow melting systems. The controller is an economical and reliable control in the melting of snow and ice prevention.

Gutter / Downspout Application: select ETS-3351 + ETOR-55 + ETF-744/99 Ground Application: select ETS-3551 + ETOG-55

ETS	Code No.	Description		
	**ETS-3551**	Controller	Supply voltage	24V AC ± 10%
			Mounting type	Din Rail
			On/off differential	1.8F (1C)
			Relays (potential free)	Single 10A, dry contact
			Ambient temp.	+32° to +122°F (0° to 50°C)
			Temperature range	+32° to +41°F (0° to 5°C)
			Detecting mode (MOIST CONTROL)	ON: Moisture & temperature
				OFF: Temperature only

ETOG Ground Sensor detects temperature and moisture and is designed for embedding into the surface of the outdoor area.

ETOG	Code No.	Description		
	**ETOG-55**	Ground sensor	Housing	IP68
			Ambient temperature	-4° to 158°F (-20° to 70°C)
			Cable length	33 ft. (10.0 m)

ETOR Gutter Sensor detects moisture and is designed for mounting in gutters and downspouts. Mounted in combination with ETF outdoor sensor.

ETOR	Code No.	Description		
	**ETOR-55**	Gutter sensor	Housing	IP68
			Ambient temperature	-4° to 158°F (-20° to 70°C)
			Cable length	33 ft. (10.0 m)

ETF Outdoor Sensor detects air temperature and is designed for mounting in gutters and downspouts. Mounted in combination with ETOR gutter sensor or the ETOG ground sensor. The ETF outdoor sensor detects a rapid decrease in air temperature to avoid ice build up.

ETF	Code No.	Description		
	**ETF-744/99**	Outdoor sensor	Housing	IP54
			Ambient temperature	-4° to 158°F (-20° to 70°C)
			Cable length	Not supplied

Please fax/email orders to:
416-352-5981/Custservlx@danfoss.com

For technical assistance call:
Toll Free: 866-375-HVAC (4822)

SNOW MELTING SYSTEM CONTROLLER

The **DS-224/824** are primarily designed for hydronic pavement snow melting applications. The units can be powered from a 24VAC/VDC source.

DS-224	Code No.	Description		
	**088L3041**	Controller	Supply voltage	24 VAC/VDC ± 10%
			Mounting type	Attaches directly to ½"or ¾" rigid conduit or to a hard surface by inserting screws through the four mounting tabs
			Relays (potential free)	Single 30A, dry contact
			Ambient temp.	-40°F to +185°F (-40°C to +85°C)
			Detecting mode	ON: Mosture & temperature

DS-824	Code No.	Description		
	**088L3042**	Controller	Supply voltage	24 VAC/VDC ± 10%
			Mounting type	Attaches directly to ½"or ¾" rigid conduit or to a hard surface by inserting screws through the four mounting tabs
			Relays (potential free)	Single 30A, dry contact
			Ambient temp.	-40°F to +185°F (-40°C to +85°C)
			Detecting mode	ON: Moisture & temperature

PX SERIES PIPE FREEZE PROTECTION

The Danfoss PX-F Series of SELF-REGULATING Parallel Circuit Heating Cables provide the solution to basic FREEZE PROTECTION applications.

PX Cables Technical Data	
Available power outputs:	3, 5, 8, 10 W/ft. at 240 VAC and 120 VAC at 50ºF(+10ºC) (10, 15, 25, 33) W/m at 240 VAC and 120 VAC at 50ºF (+10ºC)
Cable diameter:	0.45" x 0.216" (11.5mm x 5.5mm)
Rated voltage:	120V-277V Max.
Minimum bending radius:	1" (25mm)
Max. rated temperature:	150ºF (65ºC) Powered 185ºF (85ºC) Un-powered
Bus wire type:	16 AWG, (1.25mm^2), Tinned Copper

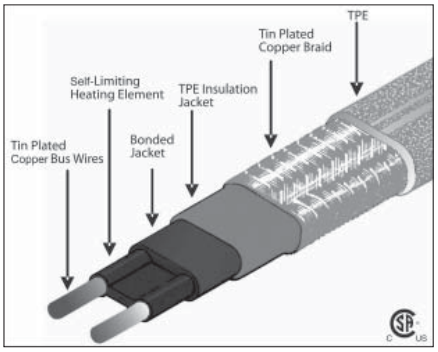
PX Selection Chart 120V

Pipe Diameter (inches)	1/2" Min.		1" Min.		2" Min.	
Pipe Material	Metal	PVC	Metal	PVC	Metal	PVC
1/2	3W/ft	5W/ft	3W/ft	3W/ft	3W/ft	3W/ft
3/4	3W/ft	5W/ft	3W/ft	3W/ft	3W/ft	3W/ft
1	5W/ft	5W/ft	3W/ft	3W/ft	3W/ft	3W/ft
1-1/4	5W/ft	8W/ft	3W/ft	5W/ft	3W/ft	3W/ft
1-1/2	5W/ft	8W/ft	3W/ft	5W/ft	3W/ft	3W/ft
2	5W/ft	8W/ft	5W/ft	5W/ft	3W/ft	3W/ft
2-1/2	8W/ft	10W/ft	5W/ft	5W/ft	3W/ft	3W/ft
3	8W/ft	10W/ft	5W/ft	5W/ft	3W/ft	5W/ft
4	10W/ft	10W/ft*	5W/ft	8W/ft	3W/ft	5W/ft
6	10W/ft*	10W/ft*	8W/ft	10W/ft	5W/ft	5W/ft
8	-	-	10W/ft	10W/ft*	5W/ft	8W/ft

PX Selection Chart 240V

Pipe Diameter (inches)	1/2" Min.		1" Min.		2" Min.	
Pipe Material	Metal	PVC	Metal	PVC	Metal	PVC
1/2	3W/ft	5W/ft	3W/ft	3W/ft	3W/ft	3W/ft
3/4	3W/ft	5W/ft	3W/ft	3W/ft	3W/ft	3W/ft
1	5W/ft	5W/ft	3W/ft	3W/ft	3W/ft	3W/ft
1-1/4	5W/ft	8W/ft	3W/ft	5W/ft	3W/ft	3W/ft
1-1/2	5W/ft	8W/ft	3W/ft	5W/ft	3W/ft	3W/ft
2	5W/ft	8W/ft	5W/ft	5W/ft	3W/ft	3W/ft
2-1/2	8W/ft	10W/ft	5W/ft	5W/ft	3W/ft	3W/ft
3	8W/ft	10W/ft	5W/ft	5W/ft	3W/ft	5W/ft
4	10W/ft	10W/ft*	5W/ft	8W/ft	3W/ft	5W/ft
6	10W/ft*	10W/ft*	8W/ft	10W/ft	5W/ft	5W/ft
8	-	-	10W/ft	10W/ft*	5W/ft	8W/ft

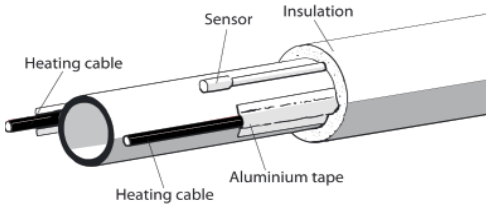
Danfoss PX Cables



Voltage Conversion Table W/ft (W/m) @ 50ºF (10ºC)

CABLE	208V	240V	277V
PX-F3	2.5 (8.5)	3.0 (10.0)	3.5 (12.5)
PX-F5	4.0 (13.5)	5.0 (15.0)	5.5 (17.5)
PX-F8	7.0 (23.0)	8.0 (25.5)	8.5 (27.5)
PX-F10	9.5 (31.5)	10.0 (33.0)	10.5 (35.0)

Typical Applications



PX Series Pipe Freeze Protection

Ordering Information

PX Cable by the Spool

Code No.	Voltage	Output at 50° F (10° C)	Spool Size (Feet)
088L1402	120V	3W/ft	250
088L1470	120V	3W/ft	1000
088L1412	240V	3W/ft	250
088L1471	240V	3W/ft	1000
088L1422	120V	5W/ft	250
088L1472	120V	5W/ft	1000
088L1432	240V	5W/ft	250
088L1473	240V	5W/ft	1000
088L1516	120V	8W/ft	250
088L1517	120V	8W/ft	1000
088L1518	240V	8W/ft	250
088L1519	240V	8W/ft	1000
088L1520	120V	10W/ft	250
088L1521	120V	10W/ft	1000
088L1522	240V	10W/ft	250
088L1523	240V	10W/ft	1000

PX Cable Cut to Length

Code No.	Voltage	Output at 50° F (10° C)
088L1460	120V	3W/ft
088L1461	240V	3W/ft
088L1462	120V	5W/ft
088L1463	240V	5W/ft
088L1469	120V	8W/ft
088L1468	240V	8W/ft
088L1479	120V	10W/ft
088L1478	240V	10W/ft


Code No. 088L3422


Code No. 088L0006


Code No. 088L0008


Code No. 088L0023

Pipe Freeze Protection Controls

The Weatherproof Thermostat is designed for temperature control and serves as an operational control only.

PX Controls

Code No.	Description	Voltage
088L3422	Weatherproof Thermostat with Water-tight Enclosure	120V -277V

Pipe Freeze Protection Accessories

PX Accessories

Code No.	Description
088L0006	Power Connection Kit cable to power lead includes one end seal
088L0008	Splice/Tee Kit includes one end seal
088L0009	Aluminum Application Tape (75ft.)
088L0023	Power Connection Kit cable to box includes one end seal
088L0412	Warning Labels 10 pcs


Code No. 088L0412


Code No. 088L0009

Ice Guard Pre-Terminated Self Regulating Cable

The **Danfoss Ice Guard Self-Regulating Heating Cable** provides an easy to use solution for a variety of Freeze Protection applications. The heat output of the conductive core material increases and decreases when it is needed as it adjusts the power output to the varying conditions along the length of the pipe. This ensures maximum energy efficiency by producing heat only when and where it is needed.

The Ice Guard Cable can be overlapped without creating hot spots or burn outs. Made from Contractor grade 16 AWG Bus Cable with a 6 foot long power lead, the Ice Guard Self Regulating cable is your simple solution to all your freeze protection needs.

Ice Guard Self Regulating Cable - 120V

Code No.	Length (ft.)	Output @ 50°F
088L1480	6 ft	5W/ft
088L1481	12 ft	5W/ft
088L1482	18 ft	5W/ft
088L1483	24 ft	5W/ft
088L1484	50 ft	5W/ft
088L1485	75 ft	5W/ft
088L1486	100ft	5W/ft

Ice Guard Self Regulating Cable - 240V

Code No.	Length (ft.)	Output @ 50°F
088L1490	6 ft	5W/ft
088L1491	12 ft	5W/ft
088L1492	18 ft	5W/ft
088L1493	24 ft	5W/ft
088L1494	50 ft	5W/ft
088L1495	75 ft	5W/ft
088L1496	100ft	5W/ft

For spare parts and accessories see pages: 34 - 45

AVTB, AVTB-RA

AVTB self acting proportional controllers are used to regulate the temperature of water to heat exchangers, oil pre-heaters and many other heating functions. AVTB valves close on temperature rise.

AVTB	Code No.	Model	Connection		Cap. Length	Temperature Range	Master Carton Qty.
			Size (FNPT)	Cv			
	**003N6032**	AVTB 15	1/2"	2.2	6′ 6″ (2.0 m)	32°-86°F (0°-30°C)	10 pcs.
	003N6252					70°-140°F (20°-60°C)	
	003N6272					125°-190°F (50°-90°C)	
	003N7032	AVTB 20	3/4"	4.0		32°-86°F (0°-30°C)	
	003N7252					70°-140°F (20°-60°C)	
	003N7272					125°-190°F (50°-90°C)	
	003N8032	AVTB 25	1"	6.4		32°-86°F (0°-30°C)	
	003N8252					70°-140°F (20°-60°C)	
	003N8272					125°-190°F (50°-90°C)	

AVTB-RA self acting proportional controllers are used to regulate the temperature of water in cooling applications. AVTB-RA valves open on temperature rise.

AVTB - RA	Code No.	Model	Connection		Cap. Length	Temperature Range	Master Carton Qty.
			Size (FNPT)	Cv			
	**003N6032RA**	AVTB-RA 15	1/2"	2.2	6′ 6″ (2.0 m)	32° - 86°F (0° - 30°C)	10 pcs.
	003N6252RA					77° - 149°F (25° - 65°C)	
	003N6272RA					122° - 194°F (50° - 90°C)	
	003N7032RA	AVTB-RA 20	3/4"	4.0		32° - 86°F (0° - 30°C)	
	003N7252RA					77° - 149°F (25° - 65°C)	
	003N7272RA					122°- 194°F (50° - 90°C)	
	003N8032RA	AVTB-RA 25	1"	6.4		32°- 86°F (0° - 30°C)	
	003N8252RA					77° - 149°F (25° - 65°C)	
	003N8272RA					122° - 194°F (50° - 90°C)	

	**AVTBWELL**	Sensor Pocket, max. pressure 341 Psi, L = 8.7″ (25 bar / 220 mm)	3/4″ NPT, Brass for 0.7″ sensor
	003N0053		3/4″ NPT, Stainless Steel for 0.7″ sensor

For spare parts and accessories see pages: 34 - 45

BALANCING VALVES

STV / STVL provide a high level of balancing accuracy using an easy to adjust wheel with a digital display. Valves include memory stop and dual differential pressure read out ports as standard equipment.

STV / STVL	Code No.	Description			
		Connection		Cv	Construction
		Size	Type		
	**065F8965**	1/2″	NPT	4.1	Brass
	065F896501		Solder		
	065F8966	3/4″	NPT	5.9	
	065F896601		Solder		
	065F8967	1″	NPT	10.2	
	065F896701		Solder		
	065F8968	1-1/4″	NPT	15.2	
	065F896801		Solder		
	065F8969	1-1/2″	NPT	22.6	
	065F896901		Solder		
	065F8970	2″	NPT	36.5	
	065F897001		Solder		

STVA provide a high level of balancing accuracy using an easy to adjust wheel with a digital display. Valves include memory stop and dual differential pressure read out ports as standard equipment.

STVA	Code No.	Description			
		Connection		Cv	Construction
		Size	Type		
	**065F8971**	2-1/2″	Flanged (ANSI 125) (Flanges not supplied)	108	Cast Iron
	065F8972	3″		128	
	065F8973	4″		220	
	065F8974	5″		349	
	065F8975	6″		493	
	065F8993	8″		696	
	065F8994	10″		1405	
	065F8995	12″		1764	

AVDO

AVDO is a self-acting automatic by-pass control primarily used either to maintain minimum flow rates or to control the differential pressure in a heating system. AVDO opens on rising differential pressure.

AVDO	Code No.	Model	Connection		Description
			Size	Type	
	**003L602001**	AVDO 15	1/2"	Union Solder	Straight Valve Body
	003L602002			Union Male, NPT	
	003L602501	AVDO 20	3/4"	Union Solder	
	003L602502			Union Male, NPT	
	003L603002	AVDO 25	1"	Union Male, NPT	

For spare parts and accessories see pages: 34 - 45

ESBE 3-WAY MIXING VALVES

ESBE Series VRG130 is a range of compact, low leakage mixing valves. For easy manual operation the valves are equipped with non-slip knobs and end stops for an operational angle of 90°. The valve position scale can be turned over and rotated allowing many different mounting positions. Together with ARA600 and Series 90 actuators, the VRG valves are easily automated and have excellent regulating accuracy due to the unique valve to actuator interface.

ESBE VRG	Code No.	Description				
		Connection		Cv	Body	Series
		Size	Type			
	**193B1500**	1/2″	FNPT	2.9	3 Way DZR Brass	VRG 131
	193B1501	3/4″		4.7		
	193B1502	3/4″		7.3		
	193B1503	1″		7.3		
	193B1504	1″		11.7		
	193B1505	1-1/4″		18.7		
	193B1506	1-1/2″		29.3		
	193B1507	2″		46.8		

If 90 series actuators are used on valves 2″ and below, mounting kit 193B1616 must be used.

ESBE Type F 3-way valves are ideal for mixing or diverting applications in heating and cooling systems. The required system temperature is obtained by adding a suitable portion of return water to the boiler flow. The mixing proportions are adjusted manually or, in automatically controlled applications, by means of an actuator (driven from a reset controller or DDC system). The scale is graduated on both sides and can be turned, allowing a choice of mounting positions.

ESBE Type F	Code No.	Description				
		Connection		Cv	Body	Reference
		Size	Type			
	**065B8960**	2-1/2″	ANSI Flange	75	3 Way Cast Iron	3 F 65-50
	065B8961	2-1/2″		105		3 F 65
	065B8962	3″		175		3 F 80
	065B8963	4″		265		3 F 100
	065B8964	5″		325		3 F 125
	065B8965	6″		465		3 F 150

See page 51 for ESBE cross reference.

For spare parts and accessories see pages: 34 - 45

ESBE 4-WAY MIXING VALVES

ESBE Series VRG140 is a range of compact, low leakage mixing valves. For easy manual operation the valves are equipped with non-slip knobs and end stops for an operational angle of 90°. The valve position scale can be turned over and rotated allowing many different mounting positions. Together with ARA600 and Series 90 actuators, the VRG valves are easily automated and have excellent regulating accuracy due to the unique valve to actuator interface.

ESBE VRG	Code No.	Description				
		Connection		Cv	Body	Series
		Size	Type			
	**193B1531**	3/4″	FNPT	4.7	4 Way DZR Brass	VRG 141
	193B1532	3/4″		7.3		
	193B1533	1″		11.7		
	193B1534	1-1/4″		18.7		
	193B1535	1-1/2″		29.3		
	193B1536	2″		46.8		
	193B1537	3/4"	Solder	2.9		
	193B1538	1"		7.3		
	193B1539	1 1/4"		13.9		

ESBE Type F 4-way valves are designed for use in commercial or residential heating and cooling systems, to control and distribute water or non-corrosive liquids to different zones. The ESBE four-way valve features a double mixing function. When hot water from the boiler is mixed with the return water, the temperature of the returned water rises (higher than can be achieved with a 3- way valve), reducing the risk of condensation and assuring a longer boiler life. The mixing proportions can be adjusted manually, or in automatically controlled applications, by means of a control actuator. The scale is graduated on both sides and can be turned, allowing a choice of mounting positions.

ESBE Type F	Code No.	Description				
		Connection		Cv	Body	Reference
		Size	Type			
	**065B6150**	2"	DIN Flange	75	4 Way Cast Iron	4 F 50
	065B6165	2-1/2″		105		4 F 65
	065B6180	3″		175		4 F 80
	065B6200	4″		265		4 F 100
	065B6225	5″		325		4 F 125
	065B6250	6″		465		4 F 150

DIN Flange Sets for use with ESBE "F" Series 4-way mixing valves.

DIN Flanges / Gaskets	Code No.	Size	Description
	**065F8950**	2"	DIN Flange (Four Flanges Required per 4 Way Valve)
	082F8961	2-1/2″	
	082F8962	3″	
	082F8963	4″	
	082F8964	5″	
	082F8965	6″	
	**065F8951**	2"	Gasket for DIN Flange (Four Gaskets Required per 4 Way Valve)
	082F8966	2-1/2″	
	082F8967	3″	
	082F8968	4″	
	082F8969	5″	
	082F8970	6″	

ESBE SERIES ARA600 ACTUATORS

ESBE Series ARA600 are compact actuators for operating ESBE mixing valves up to 2". The actuators have an operating range of 90° and can easily be manually operated. Actuators are supplied with mounting kits for ESBE rotary valves.

3 Point (Floating) 24VAC. Recommended for mixing and diverting applications.

ARA Actuator	Code No.	Series	Running Time for 90° @ 60 Hz (seconds)	Internal Auxiliary Switch	Torque in. lb. (Nm)
	**193B1600**	ARA663	96	No	53 (6)
	193B1601	ARA644	24	Yes	
	193B1602	ARA654	48		
	193B1603	ARA664	96		

2 Point 24VAC. Recommended for diverting applications.

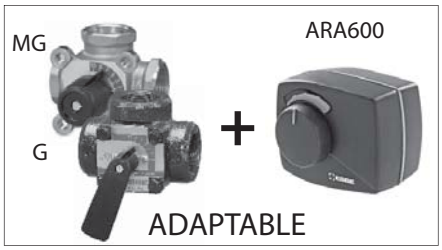
ARA Actuator	Code No.	Series	Running Time for 90° @ 60 Hz (seconds)	Internal Auxiliary Switch	Torque in. lb. (Nm)
	**193B1604**	ARA638	12	Yes	26 (3)
	193B1605	ARA648	24		53 (6)

Proportional 24V AC/DC. Recommended for mixing and diverting applications.

ARA Actuator	Code No.	Series	Running Time for 90° @ 60 Hz (seconds)	Operation	Internal Auxiliary Switch	Torque in. lb. (Nm)
	**193B1606 ***	ARA639 *	15 / 30 / 60 / 120	Proportional 0-10Vdc, 2-10Vdc, 0-20mA, 4-20mA	No	53 (6)
	193B1607	ARA659	45 / 120			

* 193B1606 ARA639 is supplied with internal wiring terminal, no connection cable is included. ARA639 can also be used for 3- and 2-point signal control.

COMBINATIONS



See page 51 for ESBE cross reference.

For spare parts and accessories see pages: 34 - 45

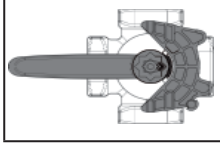
ESBE SERIES 90 ACTUATORS

ESBE Series 90 are direct mount, compact actuators designed to operate 3 and 4-way ESBE mixing valves. The actuators are reversible and their rotation can be set between 15º and 180º.

NOTE : If using with VRG style valves, must use mounting kit 193B1616 listed below.

ESBE Series 90 Actuators	Code No.	Series	Volt.	Operation	Running Time for 90° @ 60 Hz (seconds)	Torque in. lb. (Nm)	Designed for Use With
	**065F8952**	91EM	24 V	Floating (3 point)	12	45 (5)	Valves up to 2" only
	065F8953	92EM		Floating (3 point) c/w aux. switch	50	135 (15)	All ESBE Rotary Mixing Valves Max. Differential pressure drop: 1-1/2" - 2": 8 psi 2-1/2" - 6": 5 psi
	065F8959	92-2EM			100		
	065F8954	93EM			240		
	065F8955	92P		Proportional (0-10 V, 2-10 V, 0-20 mA, 4-20 mA)	60 / 90 / 120		
	065F8956	92K2		Built-In Temp. Control	50		

* 91EM recommended for diverting applications only due to short running time.

VRG Mounting Kit	Code No.	Description
	**193B1616**	Mounting Kit for Series 90 Actuator for VRG Series Valves

VM-GIB HIGH TORQUE ACTUATORS

VM-GIB non-spring return actuators are used with VL24 mounting kits to operate 3 and 4-way ESBE rotary mixing valves.
Actuators have manual override, stall protection and are field reversible. Rotation is adjustable between 0° and 90° at 5-degree intervals. Cable Connection: 18 AWG, 3 ft (0.9 m) . Enclosure Rating: NEMA 2.

Note: VM-GIB actuator can only be used with ESBE MG, G and F series.

VM-GIB	Code No.	Model No.	Input Signal	Feedback Signal	Power Requirement	Torque in. lb. (Nm)	Run Time for 90° @ 60 Hz (seconds)
	**193B1790**	VM-GIB131.1U	3 point	N/A	24 vac ± 20% 8 VA	310 (35)	125
	193B1791	VM-GIB161.1U	0 to 10 Vdc	0 to 10 Vdc			

VL24	Code No.	Model No.	Description
	193B1792	VL24	Required Mounting Kit for VM-GIB actuators to ESBE rotary mixing valves.

ESBE SERIES VTC THERMOSTATIC VALVES

ESBE Series VTC511 Thermostatic Valves are used to protect boilers from return temperatures that are too low and to efficiently load accumulation tanks.

THERMOSTATIC VALVE SERIES VTC511 VALVE BODIES - Required Thermostat Ordered Separately

VTC Valve	Code No.	Series	Description			
			Connection		Cv	Valve Housing
			Size	Type		
	**193B1700**	VTC511	1"	FNPT	10.4	Ductile Iron
	193B1701	VTC511	1-1/4"		16.2	

THERMOSTATIC VALVE SERIES VTC511 THERMOSTATS

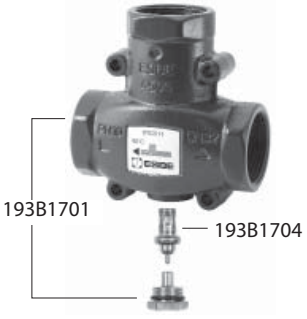
VTC Thermostat	Code No.	Series	Description	Opening Temperature	Typical Piping
	**193B1702**	VTC511	Thermostat	122°F (50°C)	Return
	193B1703	VTC511	Thermostat	131°F (55°C)	Return
	193B1704	VTC511	Thermostat	140°F (60°C)	Return
	193B1709	VTC511	Thermostat	149°F (65°C)	Supply
	193B1705	VTC511	Thermostat	158°F (70°C)	Supply
	193B1706	VTC511	Thermostat	176°F (80°C)	Supply

Note: Valve body and thermostat sold separately. Order one valve body and one thermostat to assemble a complete valve.

TV, Thermic Valve Conversion to VTC Valve Assembly

ESBE TV	Model	Size	Open Temp.	VTC Valve	VTC Thermostat	Open Temp.
065B8920	**TV461A**	1″	160°F (71°C)	193B1700	193B1705	158°F (70°C)
065B8921	**TV462A**	1 1/4″		193B1701		
065B8922	**TV463A**	1 1/2″		-	-	-
065B8923	**TV464A**	1″	140°F (60°C)	193B1700	193B1704	140°F (60°C)
065B8924	**TV465A**	1 1/4″		193B1701		
065B8925	**TV466A**	1 1/2″		-	-	-
065B8917	**TV464AL**	1″	113°F (45°C)	193B1700	193B1702	122°F (50°C)
065B8918	**TV465AL**	1 1/4″		193B1701		
065B8919	**TV466AL**	1 1/2″		-	-	-

VTC valve and element are ordered separately. Other available temperature options are available 131°F (55°C), 149°F (65°C) and 176°F (80C).



Ordering Example:

Requirement: 1-1/4″VTC Thermostatic Valve with 140°F (60°C) thermostat.

Order: One (1) 193B1701 VTC 511 valve body (includes brass cover) and one (1) 193B1704 140°F (60°C) thermostat.

Note: Thermostat is inserted in valve body opening and secured with threaded brass cover.

ESBE ATA DRAFT REGULATOR

ESBE ATA draft regulator is a self contained thermostatic expansion control device intended to regulate the temperature of solid fuel boilers without requiring any electrical installation or complicated linkage. The thermostatic control head senses the boiler temperature and regulates the air damper position, controlling combustion air flow.

ESBE ATA	Code No.	Conn. Size	Lifting Force	Lifting Stroke	Chain Length	Temp. Range
	**065B8900**	3/4" NPT	2.6 Pound-force (12N)	2.4" (60 mm)	5.25 ft. (1.6 m)	104° - 194°F (40° - 90°C)
	**372010**	ESBE ATA Replacement Element				104° - 194°F (40° - 90°C)

ESBE SERIES 30 MR

ESBE Series 30 MR compact thermostatic mixing valves are designed for hot water heating systems and domestic hot water distribution systems for multiple fixtures. Series 30 MR mixing valves provide anti-scald protection, and are designed for mixing applications.

Threaded

Compression

Solder with Two Check Valves

CPVC

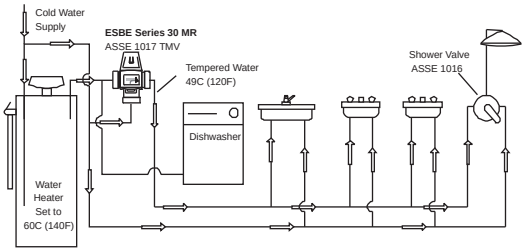
MR Series Thermostatic Mixing Valve ASSE 1017 Certified (Point of Source)
Temperature Range: 85° - 120°F

Valve Body Code No.	+	Required Tailpiece Code No.	Connection		Cv
			Size	Type	
065B8866		-	1/2"	Threaded (FNPT)	1.8
065B8869		-	3/4"	Threaded (FNPT)	1.9
065B8863		-	3/4"	Compression	1.8
065B8875	+	**065B8891**	1/2"	Solder	1.8
065B8877	+	**065B8892**	3/4"	Solder	1.9
065B8875	+	**065B8894**	1/2"	Solder with Two Check Valves	1.8
065B8877	+	**065B8895**	3/4"	Solder with Two Check Valves	1.9
065B8875	+	**065B8897**	1/2"	CPVC	1.8
065B8877	+	**065B8898**	3/4"	CPVC	1.9

MR Series Thermostatic Mixing Valve ASSE 1017 Certified (Point of Source)
Temperature Range: 95° - 140°F

Valve Body Code No.	+	Required Tailpiece Code No.	Connection		Cv
			Size	Type	
065B8867		-	1/2"	Threaded (FNPT)	1.8
065B8870		-	3/4"	Threaded (FNPT)	1.9
065B8864		-	3/4"	Compression	1.8
065B8876	+	**065B8891**	1/2"	Solder	1.8
065B8878	+	**065B8892**	3/4"	Solder	1.9
065B8876	+	**065B8894**	1/2"	Solder with Two Check Valves	1.8
065B8878	+	**065B8895**	3/4"	Solder with Two Check Valves	1.9
065B8876	+	**065B8897**	1/2"	CPVC	1.8
065B8878	+	**065B8898**	3/4"	CPVC	1.9

MR Series ASSE 1017 (Point of Source) Application Example



For spare parts and accessories see pages: 34 - 45

ESBE SERIES 30 MR

ESBE Series 30 MR compact thermostatic mixing valves are designed for hot water heating systems and domestic hot water distribution systems for multiple fixtures. Series 30 MR mixing valves provide anti-scald protection, and are designed for mixing applications.


Threaded


Compression


Solder with Two Check Valves


CPVC

MR Series Thermostatic Mixing Valves - Radiant Heating Applications (Closed Loop)
Temperature range: 70°F to 110°F

Code No.	Connection		Cv
	Size	Type	
065B8865	1/2″	Threaded (FNPT)	1.8
065B8868	3/4″	Threaded (FNPT)	1.9
065B8862	3/4″	Compression	1.8

MR Series Thermostatic Mixing Valves - Radiant Heating Applications (Closed Loop)
Temperature range: 85°F to 160°F

Valve Body Code No.	+	Required Tailpiece Code No.	Connection		Cv
			Size	Type	
065B8871		-	3/4″	Threaded (FNPT)	1.9
065B8872	+	**065B8892**	3/4″	Solder	1.9
065B8872	+	**065B8895**	3/4″	Solder with Two Check Valves	1.9
065B8872	+	**065B8898**	3/4″	CPVC	1.9

1″Thermostatic mixing valves for radiant heating applications: see page 33.

For spare parts and accessories see pages: 34 - 45

ESBE SERIES 20 MULTI-PURPOSE THERMOSTATIC MIXING VALVES

ESBE Series 20 multi-purpose thermostatic mixing valves provide accurate temperature control via a self-regulating thermostat. Series 20 mixing valves provide anti-scald protection and are suitable for mixing or diverting applications.

Threaded | Solder | Compression

SERIES 20 Thermostatic Mixing Valve - Radiant Heating Applications (Closed Loop)
Temperature Range: 68°F - 105°F

Code No.	Connection		Cv
	Size	Type	
065B8914	1″	Compression	2.8

SERIES 20 Thermostatic Mixing Valve - Radiant Heating Applications (Closed Loop)
Temperature Range: 85°F - 120°F

Code No.	Connection		Cv
	Size	Type	
065B8940	1″	Threaded (FPT)	3.0
065B8934	1″	Compression	3.0
065B893405	1″	Solder	3.0

SERIES 20 Thermostatic Mixing Valve - Radiant Heating Applications (Closed Loop)
Temperature Range: 110°F - 140°F

Code No.	Connection		Cv
	Size	Type	
065B8938	1″	Threaded (FPT)	3.2
065B8913	1″	Compression	3.2
065B891305	1″	Solder	3.2

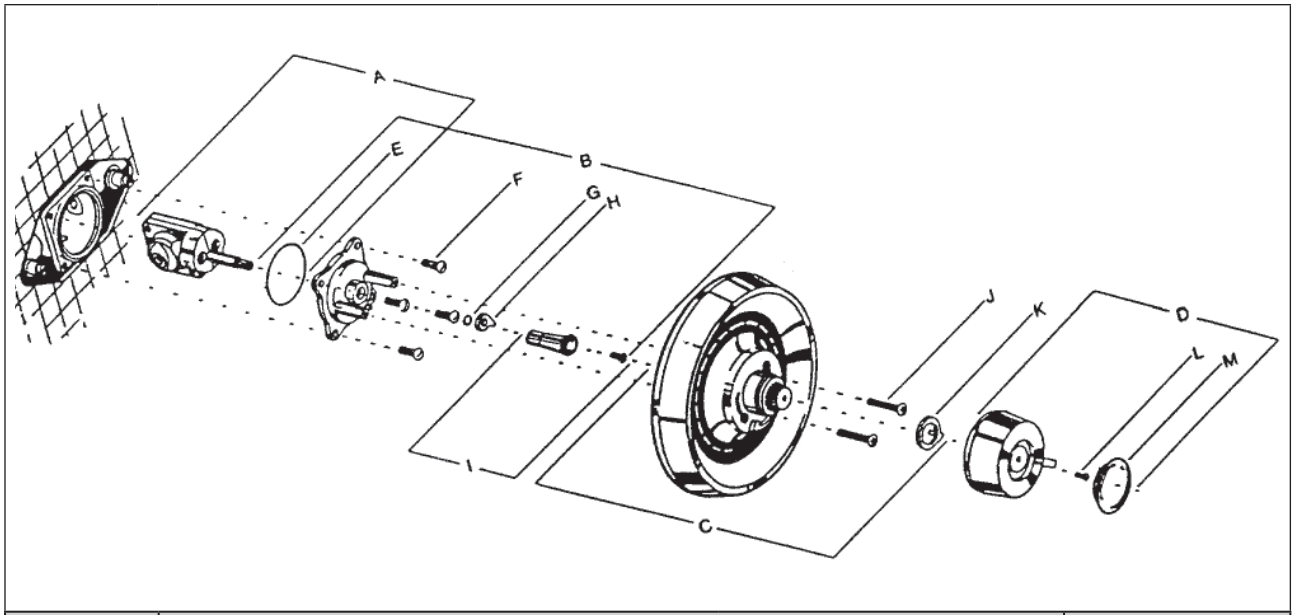
ESBE VTA 570 3-way Thermostatic Valve

VTA 570 is a 3-way thermostatic valve that can be utilized as a mixing or diverting application for hydronic closed looped systems. Typically, this thermostatic control is used as a non-electric alternative for a 2-pipe changeover diverting application. This 3-way valve is a replacement to the KOVC Thermostatic valve

VTA 570	Code No.	Design
	**31700100**	¾″ union body, 3-way thermostatic valve capable of applications involving either for mixing or diverting, settable range 50 - 86°F (10 - 30°C)
	065B8892	¾″ solder union tailpieces

For accessories see pages: 34 - 45

TEMPRESS II SPARE PARTS



	Description		Code No.
A	Tempress II Cartridge		**41 03 1285**
B	Valve Body cover. Includes items E, F, G, H and I.		**31 03 1216**
C	Escutcheon assembly. Includes J & K	Chrome plated metal	**39 03 0399**
D	Handle assembly. Includes items L and M	Chrome plated ABS	**35 03 0250**
F	Valve cover screw		**31 03 0443**
G & H	Stop and 'O' Ring Replacement Kit		**31 03 1234**
I	Replacement driver assembly		**31 03 1232**
K	Hot temperature limit washer/handle position stop		**14 03 0373**
M	Snap in cap for handle	Chrome ABS	**35 03 0375**
Not Shown	'O' Ring Kit - Includes valve body to cover 'O' Ring (E) and two cartridge inlet port 'O' Rings		**31 03 1225**
	Stem Seat Kit - Includes 'O' Ring and Nylon Bushing		**31 03 1231**

THERMOSTATIC RADIATOR VALVES & OPERATOR SPARE PARTS

Thermostatic Radiator Valves	Code No.	Description	For Use With
	**013G8591**	Item # 1 Replacement Socket Body	RA 2000 Wall Mount Operators + RA 2000 Valve Bodies
	013G5503	Item # 2 Bellows Holder (set of 2 pcs)	RA 2000 Wall Mount Operators + RA 2000 Valve Bodies
	**013G8593**	Item # 1 Replacement Socket Body	RA 2000 Wall Mount Operators + RAV, VMT, and KOVM Valve Bodies
	013G5503	Item # 2 Bellows Holder (set of 2 pcs)	RA 2000 Wall Mount Operators + RAV, VMT, and KOVM Valve Bodies
	**013L8011**	1 Pipe Steam Air Vent	1 Pipe Steam RA 2000 Valves
	**013U7175**	Spare Vacuum Breaker	RA 2000 1-pipe steam valve, 013G0140
	**013G0290**	Packing Gland	All RA 2000 Valves
	**013U0070**	Packing Gland	VMT, KOVM, RAV, FHV-R and RAVL Valves
	**013G0554**	Packing Gland	RA-C Valves
	**013-7045**	Gasket	RA Valves
	**013G8070**	RA to RA 2000 Adapter	Allows RA 2000 Operators to fit RA Valves
	**013G8072**	RAV to RA 2000 Adapter	Allows RA 2000 Operators to fit RAV Valves
	**013U1021**	Replacement Remote Socket Assembly Kit For use with "discontinued" RA 2000 Remote Mounted Dial Operators (013G8262 & 013G8222).	VMT & RAV Valves
	**013G6232**	Replacement Remote Socket Assembly Kit For use with "discontinued" RA 2000 Remote Mounted Dial Operators (013G8262 & 013G8222).	RA 2000 Valves

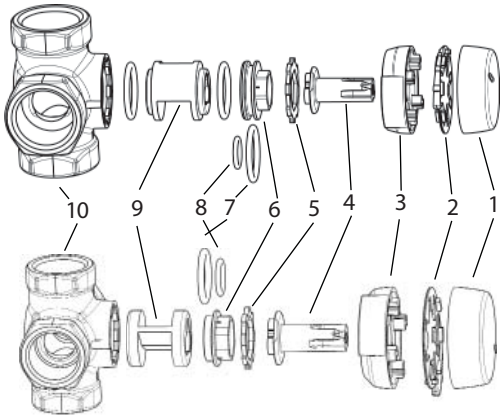
THERMOSTATIC RADIATOR VALVES & OPERATOR SPARE PARTS

Thermostatic Radiator Valves	Code No.	Description	For Use With	
	**013G1236**	Tool Set - 2mm Allen Key and Locking Pin Tool	All RA 2000 Operators	
	**013G1237**	Limitation Pins (20 pcs.)	013G8240 & 013G2922 Operators	
	**013G1232**	Cover Plugs for locking screws (Priced individually, sold in lots of 50 pcs.)	013G8240 & 013G2922 Operators	
	**013G1672**	Cover Plate for scale (20 pack)	013G8240 & 013G2922 Operators	
	**013G1246**	Limitation Pins (10 pcs.)	013G8250 & 013G8252 Operators	
	**013G5245**	Anti-theft protection clips (Sold in 20 pcs. bag - must order in multiples of 20 pieces)	013G8250 & 013G8252 Operators	
	**013L8300**	1/8" Brass Street Elbow for 1-PS (On Convectors - order 2 per valve)	1 Pipe Steam RA 2000 Valves	
	**013G1350**	Angle Adapter For use only on Hot Water Systems	RA 2000 Valves / Operators	
	**013X3180**	RAVB Replacement Kit	Replaces RAVB Operator with Valve Mounted Sensor and Dial	
	**013X3182**	RAVB Replacement Kit	Replaces RAVB Operator with Remote 6 ft. (1.8 m) Sensor	
	**013U0476**	Tailpiece	1/2"	NPT
	013U0479		3/4"	
	013U0489		1"	
	013U0504		1-1/4"	
	013U8608		1/2"	Solder
	013U8609		3/4"	
	**013U0496**	Union Nut	1/2"	NPT / Solder
	013U0499		3/4"	
	013U0501		1"	
	013U0507		1-1/4"	

THERMOSTATIC RADIATOR VALVES AND OPERATOR SPARE PARTS

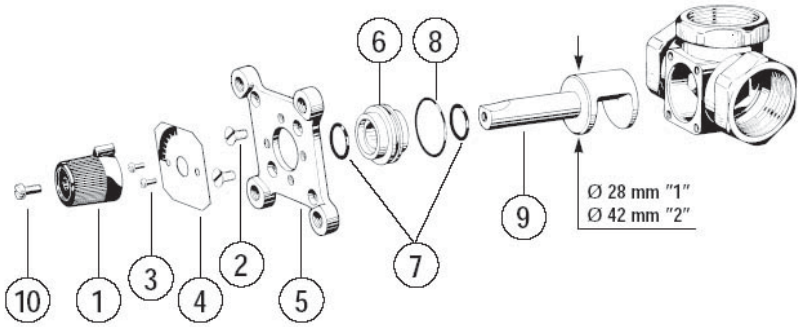
Thermostatic Radiator Valves	Code No.	Description	For Use With	
	**013G8037**	RA 2000 Valve Insert (Suitable for valves manufactured after 1990).	1/2"	Angle & Straight (NPT)
	013G8038		1/2"	Side mount Angle (NPT)
	013G8039		1/2" (solder), 3/4", 1", 1-1/4"	All
	**003L0213**	Assembly Tool for Valve Insert RA 2000, RA-C		

ESBE VRG 3 & 4 WAY MIXING & DIVERTING VALVES SPARE PARTS



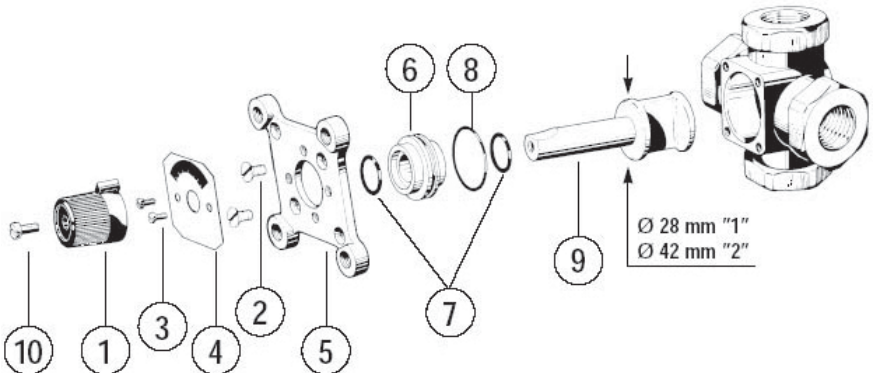
Item No.	Description	Code No.
1 & 2	VRG Valve Knob & Scale	**17006940**
3, 4, 6 & 8	Valve Shaft & Seal Kit, ½" & ¾" 3 & 4-way	**17006900**
3, 4, 6 & 8	Valve Shaft & Seal Kit, 1" 3 & 4-way	**17006910**
3, 4, 6 & 8	Valve Shaft & Seal Kit, 1-¼" 3 & 4-way	**17006920**
3, 4, 6 & 8	Valve Shaft & Seal Kit, 1-½"& 2" 3 & 4-way	**17006930**

ESBE 3-WAY MG VALVE SPARE PARTS



Item No.	Description	1/2" to 1" (065B8972)	1" (065B8968) to 1-1/4"
1	Knob	Not Sold Separately	Not Sold Separately
2	Screw - Body		
3	Screw - Scale Plate		
4	Scale Plate		
5	Cover Plate		
7	"O" Ring		
		Part No.	**Part No.**
6 - 8	Gasket Set	**082F8976**	**082F8976**
9	Plug / Spindle	Not Sold Separately	Not Sold Separately
1 - 10	Interior Complete	**082F8975**	**065B8956**

ESBE 4-WAY MG VALVE SPARE PARTS

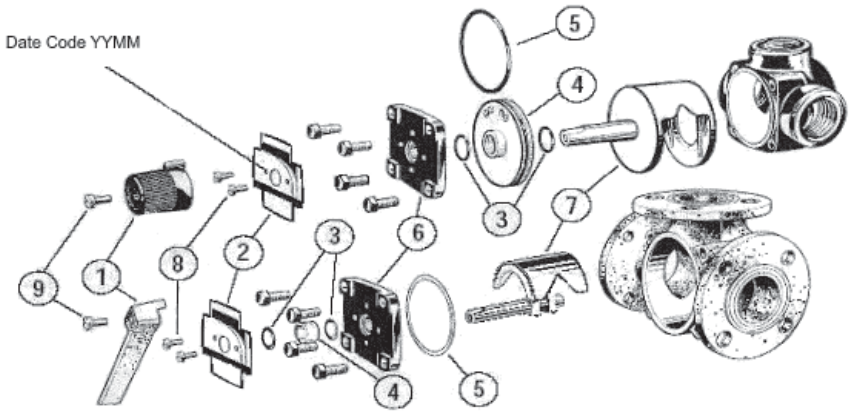


Item No.	Description	1/2" to 1" (065B8984)	1" (065B8985) to 1-1/4"
1	Knob	Not Sold Separately	Not Sold Separately
2	Screw - Body		
3	Screw - Scale Plate		
4	Scale Plate		
5	Cover Plate		
7	"O" Ring		
9	Plug / Spindle		
		Part No.	**Part No.**
6 - 8	Gasket Set	**082F8976**	**082F8976**
1 - 10	Interior Complete	**082F8977**	**065B8957**

ESBE 3-WAY G AND F VALVE SPARE PARTS

Note: Spare Parts apply to valves manufactured from dates listed below. Contact Danfoss for information on Spare Parts for valves manufactured prior to listed dates.

1-1/2" - Manufactured from June, 1996.
2" - Manufactured from January, 1997
2-1/2" to 6" - Manufactured from January, 1991



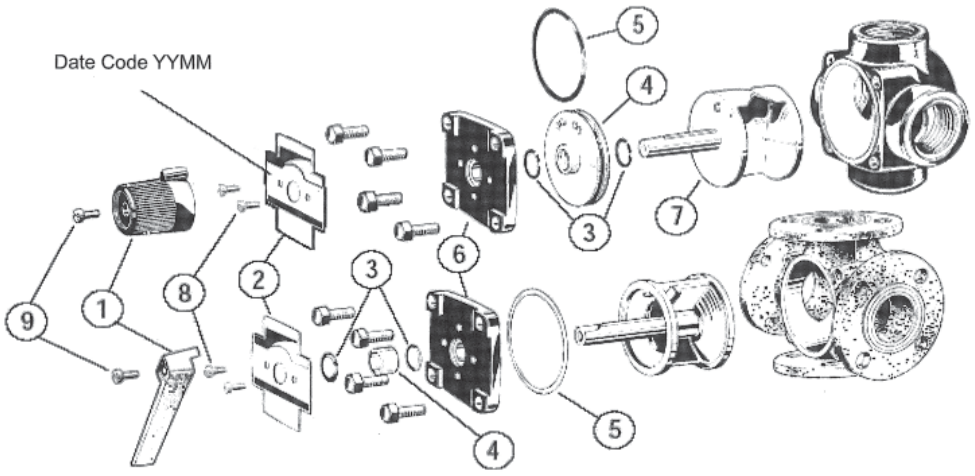
Item No.	Description	1-1/2" NPT	2" NPT	2-1/2" ANSI Flange	3" ANSI Flange
1	Handle	Not Sold Separately	Not Sold Separately	Not Sold Separately	Not Sold Separately
2	Scale Plate				
3	"O" Ring				
4	Teflon Bushing				
5	Cover Plate Gasket				
6	Cover Plate				
7	Slide / Spindle				
		Part No.	**Part No.**	**Part No.**	**Part No.**
1 - 9	Interior Complete	**082F8979**	**082F8980**	**082F8981**	**082F8982**
3-5	Gasket Set	**065B0003**	**065B0003**	**065B0003**	**065B0004**

Item No.	Description	4" ANSI Flange	5" ANSI Flange	6" ANSI Flange
1	Handle	Not Sold Separately	Not Sold Separately	Not Sold Separately
2	Scale Plate			
3	"O" Ring			
4	Teflon Bushing			
5	Cover Plate Gasket			
6	Cover Plate			
7	Slide / Spindle			
		Part No.	**Part No.**	**Part No.**
1 - 9	Interior Complete	**082F8983**	**082F8984**	**082F8985**
3-5	Gasket Set	**065B0004**	**065B0004**	**065B0004**

ESBE 4-WAY G AND F VALVE SPARE PARTS

Note: Spare Parts apply to valves manufactured from dates listed below. Contact Danfoss for information on Spare Parts for valves manufactured prior to listed dates.

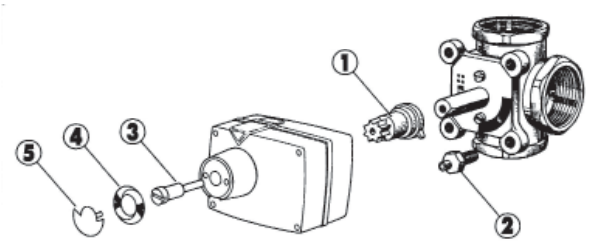
1-1/2" - Manufactured from June, 1996.
2" - Manufactured from January, 1997
2-1/2" to 6" - Manufactured from January, 1991



Item No.	Description	1-1/2" NPT	2" NPT	2" and 2-1/2" DIN Flange
1	Knob	Not Sold Separately	Not Sold Separately	Not Sold Separately
2	Scale Plate			
3	"O" Ring			
4	Teflon Bushing			
5	Cover Plate Gasket			
6	Cover Plate			
7	Spindle with Plug			
		Part No.	**Part No.**	**Part No.**
1 - 9	Interior Complete	**082F8986**	**082F8987**	**082F8988**
3-5	Gasket Set	**065B0003**	**065B0003**	**065B0003**

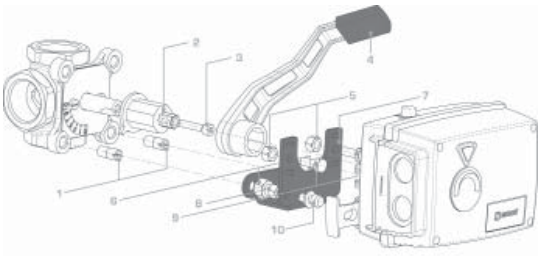
Item No.	Description	3" DIN Flange	4" and 5" DIN Flange	6" DIN Flange
1	Knob	Not Sold Separately	Not Sold Separately	Not Sold Separately
2	Scale Plate			
3	"O" Ring			
4	Teflon Bushing			
5	Cover Plate Gasket			
6	Cover Plate			
7	Spindle with Plug			
		Part No.	**Part No.**	**Part No.**
1 - 9	Interior Complete	**082F8989**	**082F8990**	**082F8991**
3-5	Gasket Set	**065B0004**	**065B0004**	**065B0004**

ESBE SERIES 60 ACTUATORS



Item No.	Description	Code No.
2	Mounting Screw	Not Sold Separately
3	Locking Screw	
4	Label	
5	Plastic Cap	
1	Plastic Driver	**065B8929**
1-5	Mounting Kit	**600-0000**

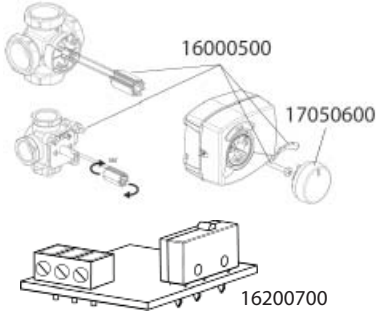
ESBE SERIES 90 ACTUATORS



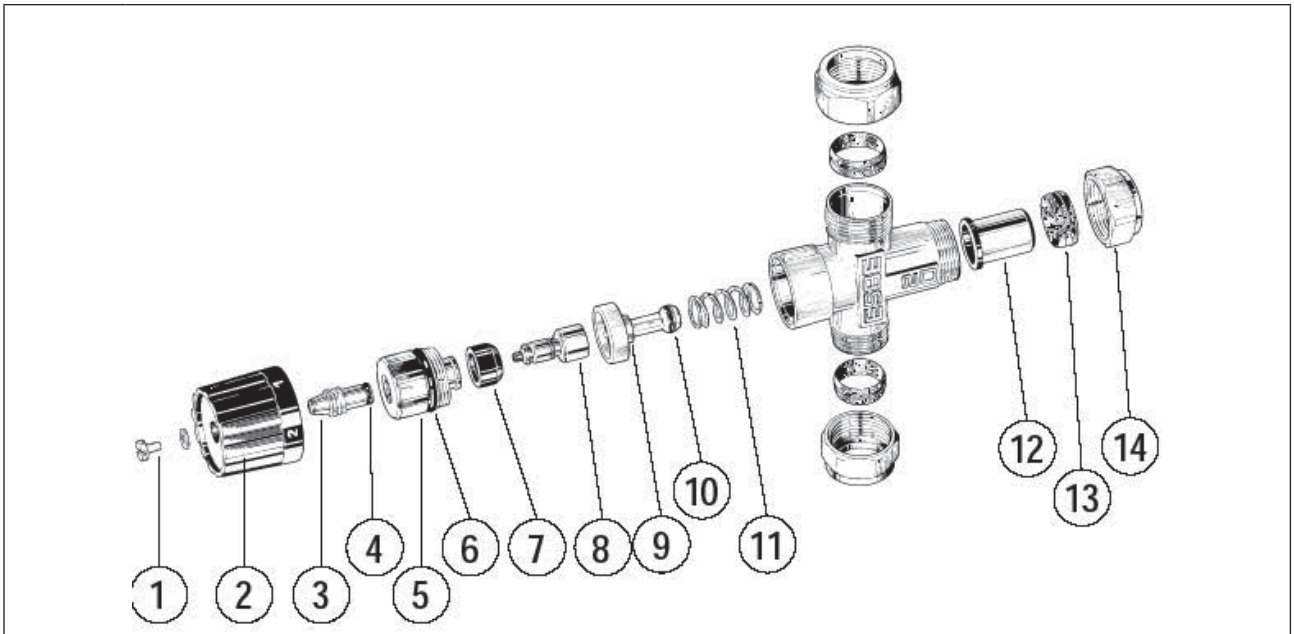
Item No.	Description	Code No.
2	Drive Sleeve	**25413**
1-10	MG, G and F mounting kit for Series 90 actuator	**193B1615**
Not Shown	VRG mounting kit for Series 90 actuator	**193B1616**
Linkage Kits for Non-ESBE Valves (Not Shown)	Viessmann Valves	**065F8957**
	Centra # 900 Valves	**065F8958**
	Landis & Staefa Valves	**065F8990**
	Oventrop Valves	**065F8991**
	TA VTR Valves	**065F8992**
Sensor (Not Shown)	92K2 Motors	**25430**

Spare parts for ARA600 Series

Code No.	Description
16000500	Assembly kit: drive sleeve, mounting stud scale and mounting screw
17050600	ARA motor actuator knob
16200700	Auxiliary end switch kit, includes end switch, cable and wiring plate cover



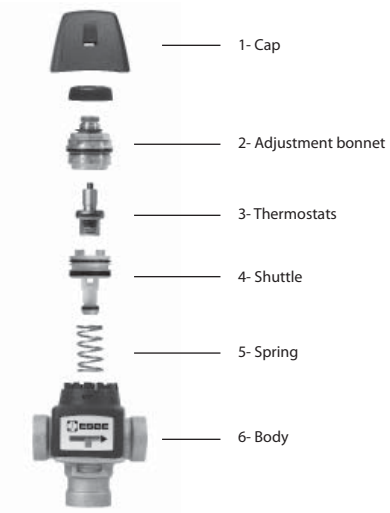
ESBE SERIES 20 THERMOSTATIC MIXING VALVE SPARE PARTS



Item No.	Description	Temperature Range	1/2" and 3/4"	1"
			Code No.	Code No.
1 - 9	Replacement Kit	110° - 140°F (43°- 50°C)	**082F8994**	**082F8997**
		68°- 105°F (20°- 40°C)	**082F8995**	**082F8998**
		85°- 120°F (29°- 49°C)	**082F8996**	**082F8999**

Item No.	Description	Size	Code No.
13	Compression Ring	3/4"	**065B8906**
		1"	**065B6805**
14	Compression Nut	3/4"	**150810**
		1"	**22218A**
Not shown	Solder Tail Piece	1"	**25620000**

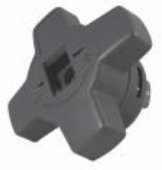
ESBE SERIES 30 MR & HR THERMOSTATIC MIXING VALVE SPARE PARTS



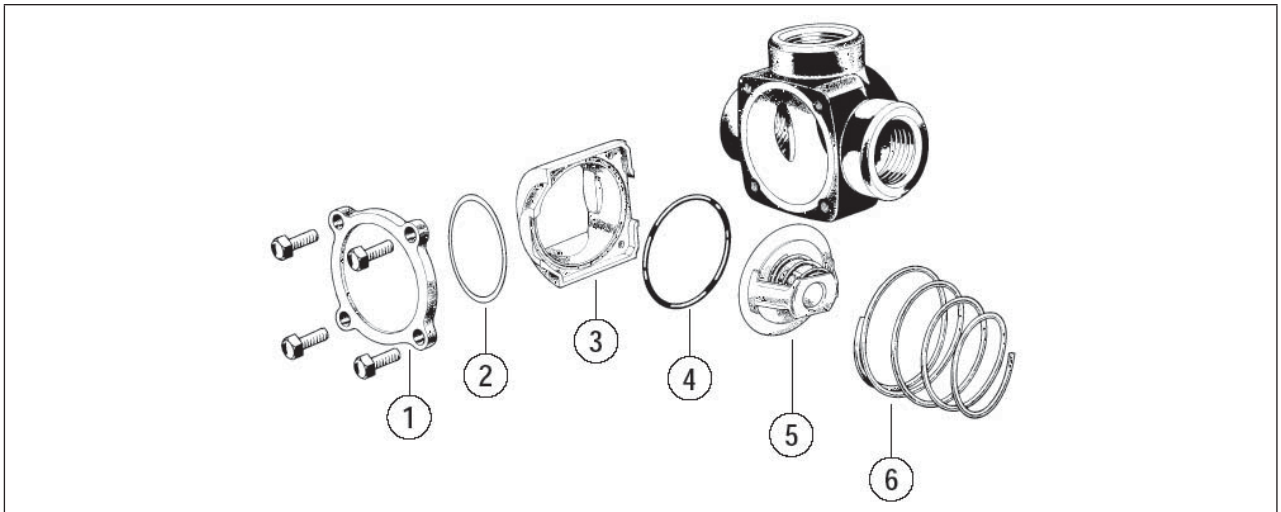
Item No.	Description	Temperature Range	Code No.
1 - 5	Repair Kit 1/2" and 3/4" Valves	70° - 110°F	**065B8842**
		85° - 120°F	**065B8843**
		95° - 140°F	**065B8844**

Item No.	Description	Code No.
1	Cap	**065B8846**

BALANCING VALVES SPARE PARTS AND ACCESSORIES

	Code No.	Description	Valve
	**065F8985**	STV Test Plug - Red Tag	1/2" - 12"
	**065F8986**	STV Test Plug - Blue Tag	1/2" - 12"
	**003Z0326**	STV 1/16" Measuring Needle (also suitable for former ESBE series 2640 / 2650)	1/2" - 12"
	**9000693**	STV / STVL Replacement Handle	1/2" - 2"
	**9000694**	STVA Replacement Handle	2-1/2" - 6"

ESBE TV BOILER BYPASS VALVE SPARE PARTS



Item No.	Description	Code No.
1	Cover Plate	Not Sold Separately
2	Cover Plate Gasket	Not Sold Separately
3	Seat	Not Sold Separately
4	'O' Ring	Not Sold Separately
5	Thermostat 60°C (140°F)	**065B8927**
	Thermostat 72°C (160°F)	**065B8926**
	Thermostat 45°C (113°F)	**065B8930**
6	Spring	Not Sold Separately

AVDO HANDLE

AVDO	Code No.	Description
	**003L5401**	AVDO Replacement Handle

8000 SERIES THERMOSTAT ACCESSORIES

Accessories	Code No.	Model No.	Description
	**087N7285**	TS2/2	Remote room sensor, can be used with all models. Can be used as averaging sensors (2, 3 or 4 sensors)
	**087N6812**	TS5	Remote duct mounting sensor, can be used with all 8000 series models
	087N6813	TS6	Remote outdoor sensor, can be used with all 8000 series models

AVTB SPARE PARTS

Service Element

AVTB	Code No.	Description	Temperature Range	Capillary Tube Length
	**003N0075**	Service Element with Capillary Tube and Sensor - Sensor diameter 0.7" x 8.3" (18 x 210 mm)	32° - 86°F (0° - 30°C)	6' 6" (2 m)
	003N0078		77° - 149°F (25° - 65°C)	
	003N0062		122° - 194°F (50° - 90°C)	

Accessories

AVT	Code No.	Description	
	**AVTBWELL**	Sensor Pocket, max. pressure 341 psi, L = 8.7" (25 bar / 220 mm)	3/4" NPT, Brass for 0.7" sensor
	003N0053		3/4" NPT, S/S for 0.7" sensor
	**003N0056**	Capillary Tube Gland	3/4" All Sensors
	**003N0388**	Mounting Bracket	All AVT Sensors
	**003N4006**	Valve Repair Kit O-ring (2-off) Diagram (2-off) Valve Cone (1-off) Screws (8-off)	1/2" AVT
	003N4007		3/4" AVT
	003N4008		1" AVT
	**003N6100**	Brass AVT Body and Top Section, less element	1/2" AVT
	003N7100		3/4" AVT
	003N8100		1" AVT
	**003N0520**	AVT Handle	All

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CROSS REFERENCE

RA 2000 THERMOSTATIC VALVE OPERATORS

Old Code No.	New Code No.	New Code Number Description
013G8200	**013G8250**	RA 2000 Operator - Valve Mounted Dial and Sensor
013G8202	**013G8252**	RA 2000 Operator - Valve Mounted Dial with Remote Sensor
013G8220	**013G8240**	RA 2000 Tamper Resistant Operator - Valve Mounted Dial and Sensor
013G2022	**013G2922**	RA 2000 Tamper Resistant Operator - Valve Mounted Dial with Remote Sensor

ELECTRIC VALVE ACTUATORS

Old Code No.	New Code No.	Old Code Number Description	
		Type	Model
082F1043	**088H3110**	NC	ABNR Actuator 24VAC, 2.0VA c/w valve position indicator
082F1143	**088H3111**	NO	ABNR Actuator 24VAC, 2.0VA c/w valve position indicator
082F1089	**082F1085**	NC	ABRA Actuator with end switch 24VAC 2.0VA
082F1042	**088H3120**	NC	ABNV Actuator 24VAC 3.2VA
082F1142	**088H3121**	NO	ABNV Actuator 24VAC 3.2VA
013F4001	**088H3120**	NC	ABF - Replace with 088H3120 TWA-V

AVTB THERMOSTATIC VALVES

Old Code No.	New Code No.	New Code Number Description
003N0051	**AVTBWELL**	Sensor pocket 3/4" NPT, brass (for 0.7" sensor)

THERMOSTATIC MIXING VALVES

Old Code No.	New Code No.	New Code Number Description				
		Size	Type	Cv	Temp. Range	Model
065B8908	**065B8865**	1/2"	Threaded	1.8	70ºF - 110ºF	MR Series Radiant Heating Applications
065B8931	**065B8866**	1/2"		1.8	85ºF - 120ºF	MR Series ASSE 1017 Certified
065B8907	**065B8867**	1/2"		1.8	95ºF - 140ºF	MR Series ASSE 1017 Certified
065B8910	**065B8868**	3/4"		1.9	70ºF - 110ºF	MR Series Radiant Heating Applications
065B8932	**065B8869**	3/4"		1.9	85ºF - 120ºF	MR Series Radiant Heating Applications
065B8909	**065B8870**	3/4"		1.9	95ºF - 140ºF	MR Series Radiant Heating Applications
065B8912	**065B8862**	3/4"	Compression	1.8	70ºF - 110ºF	MR Series Radiant Heating Applications
065B8933	**065B8863**	3/4"		1.8	85ºF - 120ºF	MR Series ASSE 1017 Certified
065B8911	**065B8864**	3/4"		1.8	95ºF - 140ºF	MR Series ASSE 1017 Certified
065B893105	**065B8875 + 065B8891**	1/2"	Solder	1.8	85ºF - 120ºF	MR Series ASSE 1017 Certified
065B890705	**065B8876 + 065B8891**	1/2"		1.8	95ºF - 140ºF	MR Series ASSE 1017 Certified
065B893205	**065B8877 + 065B8892**	3/4"		1.9	85ºF - 120ºF	MR Series ASSE 1017 Certified
065B890905	**065B8878 + 065B8892**	3/4"		1.9	95ºF - 140ºF	MR Series ASSE 1017 Certified

CROSS REFERENCE

BALANCING VALVES

Old Code No.	New Code No.	New Code Number Description				
		Size	Type	Cv	Model	Construction
003Z0030	065F8971	2-1/2"	Flanged (ANSI 125)	110	STVA	Cast Iron
003Z0031	065F8972	3"		128		
003Z0032	065F8973	4"		222		
003Z0033	065F8974	5"		350		
003Z0034	065F8975	6"		495		

RA to RA 2000 THERMOSTATIC VALVE OPERATOR REPLACEMENT

Discontinued RA Operator			RA 2000 Operator		
Code No.	Model	Description	Required Adapter		Suitable RA 2000 Operator
013-7001	RA-6	Valve Mtd Dial with Remote Sensor	013G8070 (allows RA 2000 operator to connect to discontinued RA valve body)	+	013G8252 / 2922 / 8564 / 8562 / 8565 / 8568
013-7101	RA-6 Armoured				
013-7002	RA-33	Remote Mtd. Dial and Sensor		+	013G8564 / 8562 / 8565 / 8568
013-7003	RA-36				
013-7004	RA-66				

RAV to RA 2000 THERMOSTATIC VALVE OPERATOR REPLACEMENT

Discontinued RAV Operator			RA 2000 Operator		
Code No.	Model	Description	Required Adapter		Suitable RA 2000 Operator
013U8200	RAV	Valve Mtd. Dial and Sensor	013G8072 (allows RA 2000 operator to connect to discontinued RAV valve body)	+	013G8250 / 8240
013U1100	RAVN				
013U8202	RAV	Valve Mtd. Dial with Remote Sensor		+	013G8252 / 2922
013U1102	RAVN				

RAVB to RA 2000 THERMOSTATIC VALVE OPERATOR REPLACEMENT

Discontinued RAVB Operator			Replacement Adapter Kit	
Code Number	Model	Description		
013U8101	RAVB	Pronged based thermostatic operator mounted on straight double solder union valve	013X3180	Adapter with valve mounted built-in sensor replacement operator
			013X3182	Adapter with valve mounted with remote sensor replacement operator

CROSS REFERENCE

SERIES 60 to ARA600 SERIES ACTUATOR REPLACEMENT

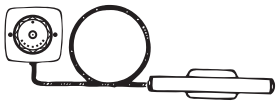
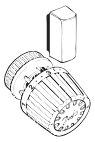
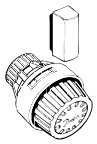
Discontinued Series 60 Actuator		Replacement ARA600 Series Actuator		
Old Code No.	**Series**	**Code No.**	**Series**	**Description**
082F8972	62E	**193B1600**	ARA663	3-point floating, 96sec rotation
-	-	**193B1601**	ARA644	3-point floating w/ end switch, 24sec rotation
-	-	**193B1602**	ARA654	3-point floating w/ end switch
082F8974	62EM	**193B1603**	ARA664	3-point floating w/ end switch, 96sec rotation
-	-	**193B1604**	ARA638	ON/OFF w/ end switch, 12sec rotation
-	-	**193B1605**	ARA648	ON/OFF w/ end switch, 24sec rotation
-	-	**193B1606**	ARA639	Proportional, w/ feedback, selectable speed
082F8973	62P	**193B1607**	ARA659	Proportional, selectable speed

ESBE MG & G VALVES to VRG130 & VRG140 REPLACEMENT

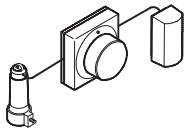
	Discontinued MG & G Valve		Replacement VRG Valve			
	Old Code No.	**Series**	**Code No.**	**Series**	**Size**	**Cv**
3-Way	**065B8950**	3MG 20-6.3	**193B1502**	VRG 131	¾", FNPT	7.3
	065B8953	3G 40	**193B1506**		1½", FNPT	29.3
	065B8954	3G 50	**193B1507**		2", FNPT	46.8
	065B8968	3MG 25-12	**193B1504**		1", FNPT	11.7
	065B8969	3MG 32-18	**193B1505**		1¼", FNPT	18.7
	065B8970	3MG 15-2.5	**193B1500**		½", FNPT	2.9
	065B8971	3MG 20-4	**193B1501**		¾", FNPT	4.7
	065B8972	3MG 25-8	**193B1503**		1", FNPT	7.3
4-Way	**065B8967**	4MG 20-2.5	**193B1537**	VRG 141	¾" Fsolder	2.9
	065B8979	4G 40	**193B1535**		1½", FNPT	29.3
	065B8980	4G 50	**193B1536**		2", FNPT	46.8
	065B8981	4MG 15-2.5	Does not crossover		½", FNPT	N/A
	065B8982	4MG 20-4	**193B1531**	VRG 141	¾", FNPT	4.7
	065B8983	4MG 20-6.3	**193B1532**		¾", FNPT	7.3
	065B8984	4MG 25-8	Does not crossover		1", FNPT	N/A
	065B8985	4MG 25-12	**193B1533**	VRG 141	1", FNPT	11.7
	065B8986	4MG 32-18	**193B1534**		1¼", FNPT	18.7
	065B8990	4MG 25-6.3	**193B1538**		1", Fsolder	7.3
	065B8991	4MG 32-12	**193B1539**		1¼", Fsolder	13.9

OPERATOR REPLACEMENT SERIES

RA and RAV are discontinued series of thermostatic radiator valves. For installations where RA or RAV valve is functioning, but the operator needs to be replaced, an adapter allows the existing valve to be used with the current RA 2000 operators.

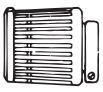
RA OPERATORS - OLD SERIES -		RA 2000 OPERATORS - NEW SERIES -			
	=	 Adapter	+		
013-7001 RA-6 OR 013-7101 RA-6		013G8070		013G8252	OR 013G2922

OR

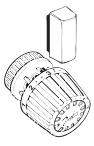
	=	 Adapter	+	
013-7002 RA-33 013-7003 RA-36 013-7004 RA-66		013G8070		013G8564

013G8200 013G8202

Note:
If replacing a previous version of RA 2000 valve mounted operator (013G8200 or 013G8202 only) installed with a RA to RA 2000 adapter, the existing adapter must be replaced. Only adapters manufactured after mid 2006 are designed to accommodate new "snap action" RA 2000 operators (013G8250 / 013G8252).

RAV OPERATORS - OLD SERIES -		RA 2000 OPERATORS - NEW SERIES -			
	=	 Adapter	+		
013U8200 RAV 013U1100 RAVN		013G8072		013G8250	OR 013G8240

OR

	=	 Adapter	+		
013U8202 RAV 013U1102 RAVN		013G8072		013G8252	OR 013G2922

Note:
RA 2000 Wall Mount Operators (013G8564 - 013G8562 - 013G8565 - 013G8568) include additional socket for use on RAV Valves. Therefore 013G8072 RAV to RA 2000 adapter is not required when replacing RAV/RAVL Wall Mount Operators with RA 2000 Wall Mount Operators.

Please fax/email orders to:
416-352-5981/Custservlx@danfoss.com
www.na.heating.danfoss.com
For technical assistance call:
Toll Free: 866-375-HVAC (4822)

GENERAL CONDITIONS FOR SALE AND WARRANTY

The acceptance of the order confirmation by the purchaser includes the acceptance of our "General Conditions of Sale and Warranty" as the only ruling condition. No modification of these conditions will be recognized by Danfoss. Any express or implied condition, statement or warranty, statutory or otherwise - not stated herein is excluded.

1. INCOTERMS

The international rules for the interpretation of trade terms "Incoterms" shall apply to the commercial terms used herein.

2. CONFIRMATION OF ORDER

Danfoss shall not be deemed to have accepted an order until written confirmation of the order from Danfoss is dispatched to the prospective purchaser. Quotations, pro forma invoices and the like, shall be subject to confirmation by Danfoss.

3. TERMS OF DELIVERY

At Danfoss' option, the goods can be delivered from any of the Danfoss factories, subsidiaries, or affiliated companies in or outside North America. Failing special instructions, the goods will be dispatched in the way which Danfoss deems best without guaranteeing this to be the cheapest way of transport.

4. PRICE REGULATIONS

Danfoss reserves the right to adjust accepted prices in the event of alterations in rates of exchange, variations in costs of materials, changes in wages, interference on the part of the Government or similar conditions over which Danfoss has no control.

5. PACKING

Disposable packing is included in the price and will not be credited if returned. Reusable packing is not included in the price and shall be returned in accordance with Danfoss' instructions at purchaser's expense.

6. RISK

Goods are shipped EXW Danfoss Warehouse North America. Danfoss shall not be responsible for loss or damage incurred during transportation.

7. TERMS OF PAYMENT

Where payment is not received when due, an interest rate of 10% per annum over and above the actual total back charge will be payable. This rate of interest will also be used in cases where an extension of the period of credit has been granted. The purchaser shall not be allowed to retain payments, or to settle debts by setting off same against possible counterclaims, disputed by Danfoss, or to reduce the invoiced price.

8. TRANSFER OF OWNERSHIP

Until full payment for the goods has been received by Danfoss, the goods shall remain the property of Danfoss and shall not be pawned or pledged in any way.

9. TIME OF DELIVERY

Time of delivery is stated approximately. Danfoss shall not be liable for any delay due to causes beyond Danfoss' control, including but not restricted to strikes, lockouts, labour disturbances or the like, or in consequence of extraordinary measures on the part of government, hindrances to transportation including ice or other transport difficulties, delayed, incomplete or defective delivery of material ordered in due time from sub-suppliers, failing supply of electricity and similar obstacles to production, fire or workshop accidents at own factories or at sub-suppliers.

10. INFORMATION

The information and technical data contained in catalogues, leaflets and other written material constitutes an approximate guide only. No responsibility for errors or wrong interpretation can be placed on Danfoss. The purchaser cannot claim any rights based on this material. Such reservation shall also apply to suggestions, advice and other services rendered to customers, including installation and servicing instruction for the product delivered.

11. ALTERATIONS

Danfoss reserves the right to make alterations to their products without notice, also to products already placed on order.

12. WARRANTY

Provided that the terms of payment are observed, the purchaser is offered a warranty of 18 months from date of Danfoss sale to purchaser. The warranty covers faulty manufacture, design and/or defective materials. The warranty shall cease to be valid if the product is repaired or altered without the consent of Danfoss, applied for purposes for which it is not designed or installed and applied contrary to the instructions given by Danfoss. Expenses in connection with dismantling and mounting shall not be paid by Danfoss. If defects occur while under warranty, the product shall be forwarded to Danfoss, insurance and freight paid. A description of the reason for returning the product shall be enclosed. Products returned shall be free of extraneous equipment. Products repaired under warranty will be returned to the purchaser, freight paid by Danfoss.
Parts which have been replaced shall be the property of Danfoss. Any other liabilities are not accepted. Guarantee for products not of Danfoss' own manufacture is only given to the same extent as given to Danfoss, however, not exceeding the normal Danfoss warranty.

13. SECONDARY DAMAGES

Danfoss shall not be held responsible for any indirect or consequential damage e.g. damages to person or property, consequential loss, including loss of production, loss of profit, loss on goods in store or the like, which might arise out of defects and/or delay in delivery of the products sold, irrespective of the cause, including faulty manufacture, design of material.

14. NOTICE OF CLAIMS

Any claim or complaint as to defects and/or delay in delivery of the products shall be submitted in writing by the purchaser to Danfoss immediately.

GENERAL CONDITIONS FOR SALE AND WARRANTY

Taxes:

All Applicable Taxes are Extra.

Freight:

FOB Danfoss, North America.

Payment:

Net 30 Days on approved credit.

Returns:

Returns accepted only with Returned Goods Authorization (RGA) obtained from Customer Service.

Credit given to returned merchandise is subject to a minimum Restocking Charge as follows:
Up to 12 months: 25%, 12 - 18 months: 50%, Over 18 months: No Value
Danfoss reserves the right to limit returns.

Goods returned must be new, in original packaging, unused and in resalable condition and are subject to inspection at Danfoss. Goods failing inspection will be returned collect with no credit issued.

No returns on special order items.

Returns must be shipped prepaid.

Warranties:

Danfoss products in this Price List are warranted for a period of 18 months from date of sale from manufacturing defects.

Warranty returns accepted only with Returned Goods Authorization (RGA) obtained from Customer Service.

Warranty items must be identified with explanation of defect.

Danfoss reserves the right to replace Warranty Return with identical item.

Warranty Returns must be prepaid.

Any Returns received without a Returned Goods Authorization Number will be returned to sender collect.

See General Terms of Sale and Warranty for complete Summary of Terms.

GO GREEN WITH DANFOSS

International cooperation is key to reducing CO2 emissions, an effective response to the global climate challenge also depends on innovation and intelligent technologies that both conserve natural resources and save money.

The task before us is to take these proven, energy-efficient technologies and apply them to solutions that can immediately reduce CO2 emissions and save energy. The money these technologies save can then be invested in more long-term development of new, green energy sources.

At Danfoss, we offer more than 75 years experience in energy-efficient technologies. We are applying that core knowledge to traditional energy solutions as well as projects that use renewable energy sources, including wind and solar. At the same time, targeted investments in innovation and new development projects will continue to support the company's position as a leader in the green economy.

For more information on Danfoss' commitment to the environment,

please visit:

www.danfoss.com/solutionsready

Danfoss
Toronto, Baltimore
Toll Free: 866-375-HVAC (4822)
www.na.heating.danfoss.com

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