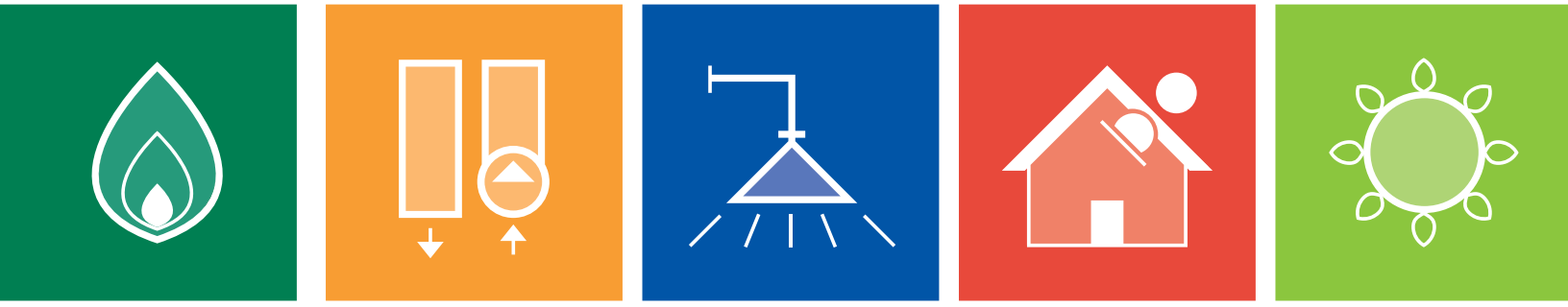
CALEFFI
Hydronic Solutions



LIST PRICE CATALOG MARCH 2016

INSTALLATION TIP VIDEOS

Courtesy of Auer Steel & Heating Supply Co., Milwaukee, WI

- To view a short installation video, scan the QR code found on the outside of the product box.
- Quick scan from any mobile smart device with internet connection
- Decrease your installation time with these quick installation tip videos.

Scan to view
Z-one™ Zone Valves
Installation Tip

PRESS FITTING FOR YOUR APPLICATIONS

- Presscon™ copper press fitting makes installation and maintenance of Caleffi components fast, easy and efficient.
- Special slots in EPDM O-ring allows fluid to leak during system testing if unpressed and the perfect leak proof seal when completely pressed.
- Temperature range of 0°F—250°F with pressure rating to 200 psi, approved to NSF-61, IPC, UPC, CSA and meets low lead law requirements.

Look for this Presscon™ logo in this catalog to find products featuring Presscon™ fittings!

Presscon™
LEAK DETECTION

1 HYDRAULIC SEPARATION

2 AIR AND DIRT SEPARATION AND VENTING DEVICES

3 THERMOSTATIC RADIATOR VALVES AND ACCESSORIES

4 ZONE VALVES AND RELAYS

5 TEMPERATURE MIXING STATIONS AND DISTRIBUTION MANIFOLDS

6 VALVES FOR DOMESTIC WATER AND HYDRONIC SYSTEMS

7 AUTOMATIC FILLING UNITS AND BACKFLOW PREVENTERS

8 BALANCING DEVICES

9 FITTINGS

10A SOLAR COMPONENTS

10B GEOTHERMAL

10C BIOMASS

11 HEAT METERS

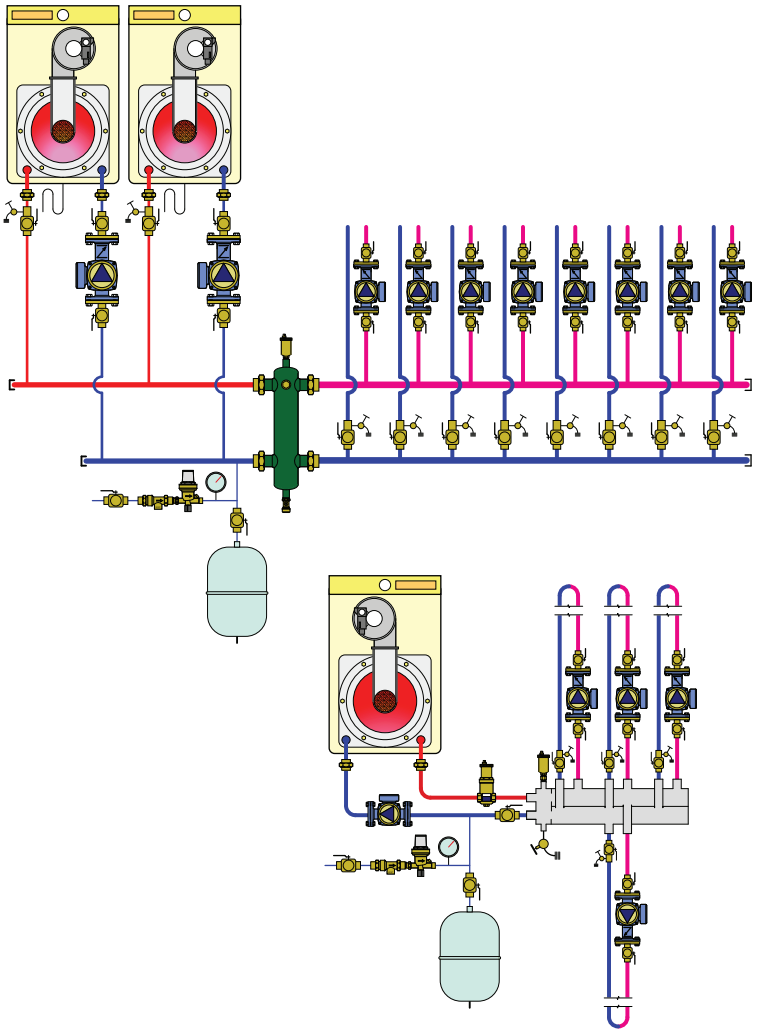
12 INDEX

GENERAL INDEX

Series	Page(s)
100	72
110	104,105
111	105
112	105
120	72
121	67
127	66
130	68
132	58,70,71,105
142	69
163	38
165	38
166	39
167	39
171	40
172	41
200	24
201	24
203	24
209	24
220	25
221	25
250	90
251	90,91
2521	91
253	91
254	93
255	85
257	96,98,100, 101,102,114, 115
259	85
278	86
279	86
280	110
281	111
301	27
314	77
315	76,77
319	75,77,94
337	11
338	26
339	26
342	26
343	26
386	47
387	25,47
413	76,77
417	76
418	77
437	28
449	24,27,49
472	24
501	7,10
5020	7,10,49,106
5021	10
5022	10
5023	7,10
5026	11
5027	11
5080	11
5081	11
519	8,39
521	52,53
5213	55
5230	55
5231	54
535	56
5350	63
538	7,8,18,72,106
546	16,18,20
548	5
549	4
5495	4
551	11,13,14,15,107
553	62
5599	6
561	11,13
562	22
573	62
586	79
594	11
597	22
598	11,22,75,94
599	75
612	79,95
626	8
644	36
656	24,30,48
659	46
663	44
668	48
668...S1	42
669	49
675	49
676	30
680	47
681	28
682	28,47
687	106
688	8,49,53,54
691	49
694	7
861	105
863	106
940	28
942	47
CBN130	68
CBN142	69
CBN546	16,18
CBN551	13
F113	8,49
F19	45,70,71,105,111
F29	86,112
F318	77,93
F360	25
F398	22
F411	77,78
F500	7,75,93
F524	53
F596	62
F610	75,93
F670	8,49
F69	33,49
NA100	31,45,53,75,76,77, 78,79,84,93,94,95, 98,100,101,107,114
NA101	62,75,78,79,82, 90,95,96,107
NA102	8,22,28,47,63, 78,79,84,90, 105,106,107
NA103	8,28,34,35,47,53, 54,62,75,79,82, 84,94,107
NA104	53,75,77
NA113	56
NA121	74,78,79,82,86,87, 89, 92,93,94,95
NA122	31,72,74,88,99
NA123	31,74
NA150	97,98,99,100, 101,107,114,115
NA155	89
NA16	31,39,45,75
NA163	45
NA164	45
NA17	45
NA223	72,88
NA254	94
NA255	50,61,85,89,90
NA256	61,85,88
NA257	100
NA266	86,87
NA267	85,86,87,88
NA292	90
NA314	84
NA350	92
NA35	92
NA39	7,15,20,105
NA475	24
NA503	8
NA510	8,74,88
NA546	17
NA5453	19
NA5465	20,21
NA548	5
NA549	4
NA551	14,15
NA553	63,64
NA570	61
NA573	61
NA575	61
NA59	7,15
NA605	30,33,97
NA61	31
NA669	49
NA797	101,114
NA86	106
NAC	80
NAL	80
NAS100	82
NAS144	82
NAS200	84,107
NAS201	84,107
NAS300	83
NAT	80
R11	75,79
R21	85
R29	91
R31	75,76,77,79,95
R392	53
R41	7,76,77,93
R500	76,77,93,95
R51	76
R530	77
R56	22,49
R59	22
R67	95
R69	49
Z1	32
Z2	33
Z3	33
Z4	31
Z5	31
ZSR	34
ZVR	35

HYDRAULIC SEPARATION

This diagram is an example



HydroCal™ 3-in-1 hydraulic separators

SEP4™ 4-in-1 hydraulic separators

Hydraulic separators

Hydraulic separators + manifolds

Hydraulic separator accessories

Miscellaneous system components

3-IN-1 HYDRAULIC SEPARATORS

549 HydroCal™

tech. broch. 01178

Combination 1. air, 2. hydraulic and 3. dirt separation.
Epoxy resin coated steel body.
Stainless steel internal coalescing mesh.
Pre-formed insulation on 2"— 4" sizes.
Complete with:
automatic air vent (code 501502A).
air vent shut-off valve (code NA39589).
drain valve (code NA39588).
ANSI 150 flange connections.
Max. working pressure: 150 psi.
Vessel temperature range: 32—220°F.
Working temp. w/o insulation: 32—270°F.
Particle separation capacity: to 5 µm (0.2 mil).

Code	Description	Lbs	USD
549052A	2" ANSI flange	73	**4,662.00**
549062A	2½" ANSI flange	79	**4,967.00**
549082A	3" ANSI flange	108	**6,216.00**
549102A	4" ANSI flange	117	**6,962.00**

Code	Description	Lbs	USD
NA549052A	2" ANSI flange ASME & CRN	73	**6,321.00**
NA549062A	2½" ANSI flange ASME & CRN	79	**6,799.00**
NA549082A	3" ANSI flange ASME & CRN	108	**8,222.00**
NA549102A	4" ANSI flange ASME & CRN	117	**8,694.00**
NA549150A	6" ANSI flange ASME & CRN*	231	**14,732.00**

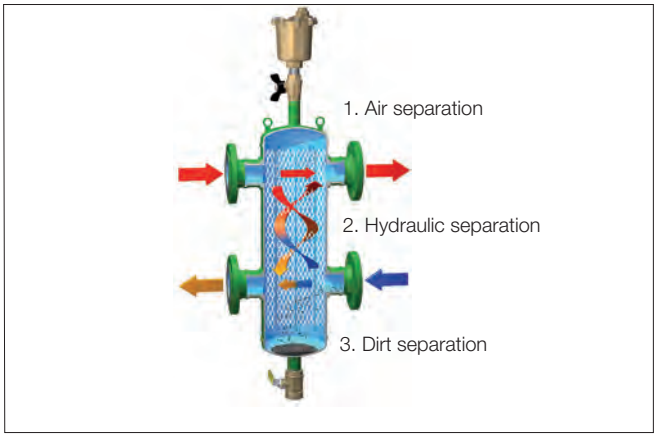
* without insulation
NA prefix indicates ASME U-stamp tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors; CRN registered.

549 HydroCal™ ASME/CRN

tech. broch. 01178

Combination 1. air, 2. hydraulic and 3. dirt separation.
Epoxy resin coated steel body.
Stainless steel internal coalescing mesh.
Without insulation.
Complete with:
automatic air vent (code 501502A).
air vent shut-off valve (code NA39589).
drain valve (code NA59600).
ANSI 150 flange connections.
Thermometer pockets (NPT):
½" inlet/outlet flanges, ¾" front center
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.
Particle separation capacity: to 5 µm (0.2 mil).
ASME U-stamp tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors; CRN registered.

Code	Description	Lbs	USD
NA549200A	8" ANSI flange ASME & CRN	520	**24,875.00**
NA549250A	10" ANSI flange ASME & CRN	730	**34,608.00**
NA549300A	12" ANSI flange ASME & CRN	1,100	**46,350.00**
NA549350A	14" ANSI flange ASME & CRN	1,400	**55,100.00**



Maximum recommended flow rates in GPM and volume capacity in gallons.

	FLOW RATE - FLANGED CONNECTIONS								
Size	2"	2½"	3"	4"	6"	8"	10"	12"	14"
GPM	37	63	96	149	380	625	1030	1650	2000
Gallons	4.0	4.0	8.0	8.0	23	95	175	255	450

4-IN-1 HYDRAULIC SEPARATORS

5495 SEP4™

tech. broch. 01249

Combination 1. air, 2. hydraulic and 3. dirt separation, plus 4. magnetic separation
Epoxy resin coated steel body.
HDPE internal coalescing element, removable for cleaning.
Pre-formed insulation.
Particle separation capacity: to 5 µm (0.2 mil).
Ferrous impurities separation efficiency: 100%.
Air separation efficiency: 100% to microbubble level.
Complete with union connections.
Thermowell tap: 1/2" straight female
Max. working pressure: 150 psi.
Working temperature range: 32—210°F.
Working temp. w/o insulation: 32—230°F.
(see page 5 for flow rate information).

Code	Description	Lbs	USD
549596A	1" sweat union	15	**1,315.00**
549506A	1" NPT F union	15	**1,375.00**
549566A	1" Press F union	15	**1,455.00**
549597A	1¼" sweat union	19	**1,585.00**
549507A	1¼" NPT F union	19	**1,665.00**
549567A	1¼" Press F union	19	**1,833.00**
549598A	1½" sweat union	27	**2,080.00**
549508A	1½" NPT F union	27	**2,185.00**
549568A	1½" Press F union	27	**2,385.00**
549599A	2" sweat union	29	**2,425.00**
549509A	2" NPT F union	29	**2,545.00**
549569A	2" Press F union	29	**2,965.00**

HYDRAULIC SEPARATORS

548 Hydro Separator

tech. broch. 01076

Hydraulic separator.
Epoxy resin coated steel body.
300 series stainless steel internal baffle.
Pre-formed insulation.
Complete with:
automatic air vent valve (code 502343A).
service check valve (code 561402A).
drain valve (code 538402 FD).
Union connections.
Thermowell tap: 1/2" straight female
Max. working pressure: 150 psi.
Working temperature range: 32—210°F.
Working temp. w/o insulation: 32—250°F.

Code	Description	Lbs	USD
548006A	1" NPT F union	13	**1,010.00**
548066A	1" Press F union	13	**1,090.00**
548096A	1" sweat union	13	**961.00**
548007A	1¼" NPT F union	17	**1,217.00**
548067A	1¼" Press F union	17	**1,385.00**
548097A	1¼" sweat union	17	**1,160.00**
548008A	1½" NPT F union	25	**1,594.00**
548068A	1½" Press F union	25	**1,794.00**
548098A	1½" sweat union	25	**1,518.00**
548009A	2" NPT F union	27	**1,860.00**
548069A	2" Press F union	27	**2,280.00**
548099A	2" sweat union	27	**1,772.00**

548 Hydro Separator

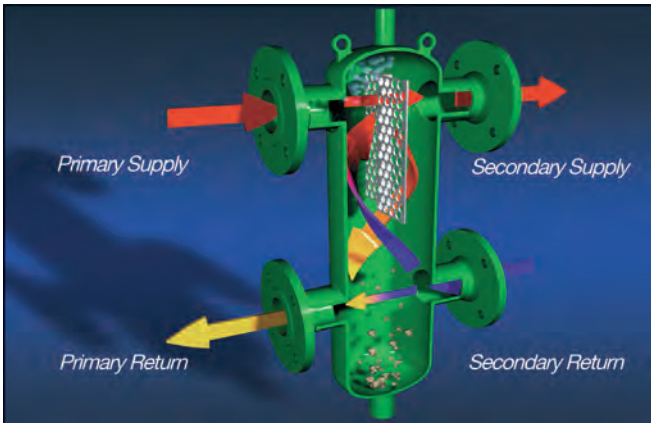
tech. broch. 01076

Hydraulic separator.
Epoxy resin coated steel body.
Pre-formed insulation on 2"— 4" sizes.
Complete with:
automatic air vent (code 501502A).
shut-off valve (code NA39589).
drain valve (code NA39588).
ANSI 150 flange connections.
Max. working pressure: 150 psi.
Vessel temperature range: 32—220°F.
Vessel temp. w/o insulation: 32—270°F.
Baffle plates for all sizes: 304SST

Code	Description	Lbs	USD
548052A	2" ANSI flange	75	**3,696.00**
548062A	2½" ANSI flange	82	**3,938.00**
548082A	3" ANSI flange	112	**4,925.00**
548102A	4" ANSI flange	117	**5,513.00**

Code	Description	Lbs	USD
NA548052A	2" ANSI flange ASME & CRN	75	**4,862.00**
NA548062A	2½" ANSI flange ASME & CRN	82	**5,229.00**
NA548082A	3" ANSI flange ASME & CRN	112	**6,326.00**
NA548102A	4" ANSI flange ASME & CRN	117	**6,689.00**
NA548120A*	5" ANSI flange ASME & CRN	220	**9,345.00**
NA548150A*	6" ANSI flange ASME & CRN	231	**11,340.00**

NA prefix indicates ASME U-stamp tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors; CRN registered.
*Without insulation



The hydraulic separator creates a zone with a low pressure loss, which enables the primary and secondary circuits connected to it to be hydraulically independent of each other; the flow in one circuit does not interfere with flow in the other.

Maximum recommended flow rates in GPM and volume capacity in gallons for 548 and 5495 series separators.

	FLOW RATE - UNION CONNECTIONS			
Size	1"	1¼"	1½"	2"
GPM	11	18	26	37
Gallons	0.5	0.7	1.3	8.5

	FLOW RATE - FLANGED CONNECTIONS									
Size	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"
GPM	60	80	124	247	300	484	792	1330	1850	2500
Gallons	4.0	4.0	8.0	8.0	22.5	23	95	175	255	450

548 Hydro Separator ASME/CRN

tech. broch. 01076

Hydraulic separator.
Epoxy resin coated steel body.
Without insulation.
Complete with:
automatic air vent (code 501502A).
shut-off valve (code NA39589).
drain valve (code NA59600).
ANSI 150 flange connections.
Thermometer pockets (NPT):
½" inlet/outlet flanges, ¾" front center
Max. working pressure: 150 psi.
Working temperature range: 32—270°F.
ASME U-stamp tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors; CRN registered.
Baffle plates for all sizes: 304SST

Code	Description	Lbs	USD
NA548200A	8" ANSI flange ASME & CRN	520	**18,386.00**
NA548250A	10" ANSI flange ASME & CRN	725	**25,956.00**
NA548300A	12" ANSI flange ASME & CRN	1,100	**31,415.00**
NA548350A	14" ANSI flange ASME & CRN	1,400	**50,100.00**

HYDRAULIC SEPARATORS-MANIFOLDS

5599 HydroLink™

tech. broch. 01084

Hydraulic separator + distribution manifold. 2+0 with built-in mounting.
Steel body with pre-formed insulation.
Complete with automatic air vent (code 502043A) and drain valve (code 538402 FD).
Max. working pressure: 100 psi.
Working temperature range: 32—230°F.
Outlet center dimension: 125 mm.
Compatible with 165, 166, 167 series HydroMixer™.

Code	Description	Lbs	USD
559920A	1" NPT female + 1" NPT male branches	16	**1,195.00**

5599 HydroLink™

tech. broch. 01084

Hydraulic separator + distribution manifold. 2+2 with angle mounting brackets.
Steel body with pre-formed insulation.
Complete with automatic air vent (code 502043A) and drain valve (code 538402 FD).
Max. working pressure: 100 psi.
Working temperature range: 32—230°F.
Outlet center dimension: 125 mm.
Compatible with 165, 166, 167 series HydroMixer™.

Code	Description	Lbs	USD
559922A	1¼" NPT female + 1" NPT male branches	29	**1,468.00**

5599 HydroLink™

tech. broch. 01084

Hydraulic separator + distribution manifold. 2+1 with built-in mounting.
Steel body with pre-formed insulation.
Complete with automatic air vent (code 502043A) and drain valve (code 538402 FD).
Max. working pressure: 100 psi.
Working temperature range: 32—230°F.
Outlet center dimension: 125 mm.
Compatible with 165, 166, 167 series HydroMixer™.

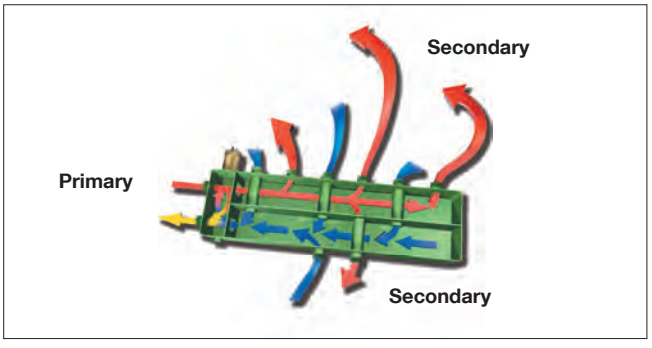
Code	Description	Lbs	USD
559921A	1" NPT female + 1" NPT male branches	16	**1,229.00**

5599 HydroLink™

tech. broch. 01084

Hydraulic separator + distribution manifold. 3+1 with angle mounting brackets.
Steel body with pre-formed insulation.
Complete with automatic air vent (code 502043A) and drain valve (code 538402 FD).
Max. working pressure: 100 psi.
Working temperature range: 32—230°F.
Outlet center dimension: 125 mm.
Compatible with 165, 166, 167 series HydroMixer™.

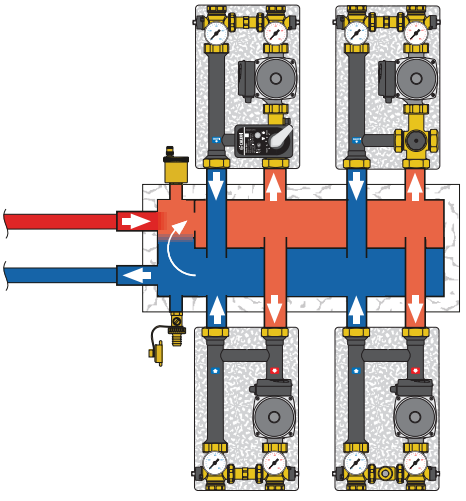
Code	Description	Lbs	USD
559931A	1¼" NPT female + 1" NPT male branches	39	**1,765.00**



Maximum recommended flow rates at connections:

Branches	Primary	Secondary Total
2+0	9 gpm	22 gpm
2+1	9 gpm	22 gpm
2+2	11 gpm	26 gpm
3+1	11 gpm	26 gpm

Application diagram



HYDRAULIC SEPARATOR ACCESSORIES

501 MAXCAL®

tech. broch. 01090

Replacement air vent for Hydro Separator 548 and NA548 series and fits HydroCal™ 549 and NA549 series.
Brass body and cover, stainless steel internal components.
Extra high discharge capacity.
Max. working pressure: 230 psi.
Max. discharge pressure: 90 psi.
Max. working temperature: 250°F.
Discharge top thread: ⅜" female.

Code	Description	Lbs	USD
501502A	¾" NPT female inlet	7	**404.30**

5020 MINICAL®

tech. broch. 01054

Replacement high capacity air vent for 5599 HydroLink™.
Automatic air vents.
Brass body.
Hygroscopic safety air vent cap.
Max. working pressure: 150 psi
Max discharge pressure: 60 psi
Max. working temperature: 250°F.

Code	Description	Lbs	USD
502043A	½" NPT male	0.6	**31.90**

5023 VALCAL®

tech. broch. 01090

Replacement high capacity air vent with service check valve fits Hydro Separator 548 series.
Brass body.
Max. working pressure: 150 psi.
Max. discharge pressure: 60 psi.
Max. working temperature: 250°F.

Code	Description	Lbs	USD
502343A	½" NPT male	0.5	**64.70**

Replacement drain valve fits Hydro Separator 548 series and HydroLink™ 559 series.
Brass body.
¾" garden hose thread with cap.
Max. working pressure: 150 psi.
Max. working temperature: 250°F.

Code	Description	Lbs	USD
538402 FD	½" NPT x ¾" GHT	0.3	**19.40**

tech. broch. 01076

Drain ball valves fit HydroCal™, Hydro Separators, DISCAL™, DISCALDIRT® and DIRTCAL®.
Brass body.
Max. working pressure: 150 psi.
Max. working temperature: 365°F.

Code	Description	Cv	Lbs	USD
NA39589	¾" NPT female w/T-handle	35	0.6	**40.00**
NA39753	1" NPT female w/T-handle	50	0.7	**54.50**
NA39588	1¼" NPT female w/Lever	104	1.0	**90.80**
NA59600	2" NPT female w/Lever	309	3.5	**195.50**

Temperature pocket well fits 1", 1¼", 1½" & 2" 548 / 5495 Hydro Separators.
1 ¾" pocket length.
Inside thread: 20 x1.0 mm

Code	Description	Lbs	USD
694045	½" straight thread	0.2	**24.60**
F50055	Sealing washer	0.1	**2.10**

Double male nipple.

Code	Description	Lbs	USD
R41447	¾" NPT x ¾" NPT x 2"	0.3	**35.50**

MISCELLANEOUS SYSTEM COMPONENTS

626

tech. broch. 01052

Universal flow switch for heating and air conditioning systems.
Suitable for 1" to 8" pipe size.
Working pressure: 150 psi.
Working temperature range: -20 – 250°F.
Minimum flow: 5.7 gpm.
Switch contacts: NO or NC
Switch rating: 15 A
CE, cUL, NEMA Type 5, IP 54.

c UL us
30V9

Code	Description	Lbs	USD
626600A	1" NPT male thread	2.3	**325.40**
626009	Replacement paddle assembly*	0.1	**30.50**

* stainless steel

519

tech. broch. 01007

Differential pressure by-pass valve.
Adjustable from 2 to 10 psi.
Brass body.
Max. working pressure: 150 psi.
Working temperature range: 32 – 230°F.
· ¾" flow up to 9 gpm.
· 1" flow up to 40 gpm.
· 1¼" flow up to 45 gpm.

Code	Description	Lbs	USD
519502A	¾" NPT inlet x ¾" NPT outlet	1.0	**168.30**
519566A	¾" press x ¾" press	1.0	**190.30**
519599A	¾" sweat inlet x ¾" sweat outlet	1.0	**166.00**
519600A	1" NPT inlet x 1" NPT outlet	1.4	**261.10**
519609A	1" NPT inlet x 1" sweat outlet	1.4	**261.10**
519700A	1¼" NPT inlet x 1¼" NPT outlet	1.5	**313.40**
519709A	1¼" NPT inlet x 1¼" sweat outlet	1.5	**313.40**

538

Boiler drain valve.
¾" garden hose thread with cap.
Brass body.
Max. working pressure: 150 psi.
Max. working temperature: 250°F.

Code	Description	Lbs	USD
538202 FD	¼" NPT male x ¾" GHT	0.3	**19.00**
538402 FD	½" NPT male x ¾" GHT	0.3	**19.40**

688

Temperature gauge with well pocket fitting for inserting into manifold ball valves.
Working temperature range: 30 – 210° F.
Face dial diameter: 2".

Code	Description	Lbs	USD
688003A	Gauge with pocket well	0.2	**50.30**
F11344	Replacement pocket well, low-lead	0.1	**5.00**
F67037	O-ring fits F11344	0.1	**1.15**

NA102

Union with temperature gauge.
Brass body and fittings.
Max. working pressure: 150 psi.
Face dial diameter: 2".
Dial scale: 30-210° F.

Code	Description	Lbs	USD
NA10295	¾" sweat union	2.2	**109.50**
NA10296	1" sweat union	2.2	**118.50**

NA103

In-line PT port
Low Lead brass body.
Max. working pressure: 150 psi.
Temperature range: 32-250°F.

Code	Description	Lbs	USD
NA10354	¼" sweat with PT port	0.2	**68.60**
NA10355	¾" sweat with PT port	0.2	**82.60**

NA510

In-line flow check valve.
Brass body and fittings.
Max. percentage of glycol: 50%.
Max. working pressure: 150 psi.
Temperature range: 32-250°F.
Open pressure: 0.29 psi

Code	Description	Cv	Lbs	USD
NA51059	¾" sweat union	12	0.7	**74.40**
NA51069	1" sweat union	17	1.0	**95.00**

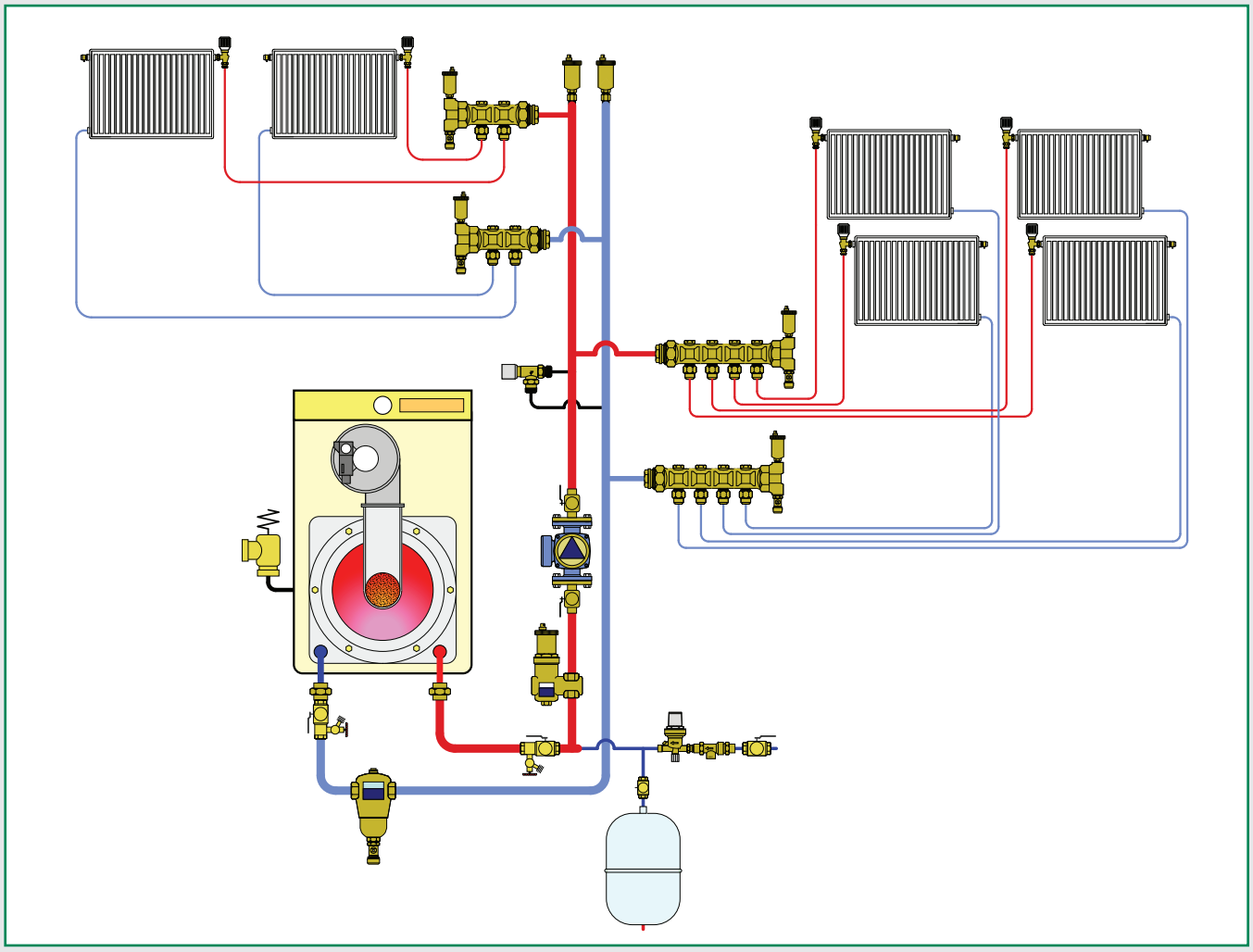
NA503

Tridicator dual pressure / temperature gauge for boilers. Dial size: 3 1/8".
Pressure range: 0—75 PSI.
Temperature range: 60—320 F.
¼" NPT rear probe.
For direct fluid stream submersion.

Code	Description	Lbs	USD
NA503040	¼" NPT	0.2	**44.60**

AIR AND DIRT SEPARATION AND VENTING DEVICES

This diagram is an example



Automatic air vents, MINICAL®

Manual air vents

Dirt separators, DIRTCAL®

Magnetic dirt separators, DIRTMAG®

Dirt separators for commercial applications, DIRTCAL®

High discharge automatic air vent, DISCALAIR®

Air separators, DISCAL®

Air separators for commercial applications, DISCAL®

Air and dirt separators, DISCALDIRT®

Air and magnetic dirt separators, DISCALDIRTMAG®

Accessories for air and dirt separators

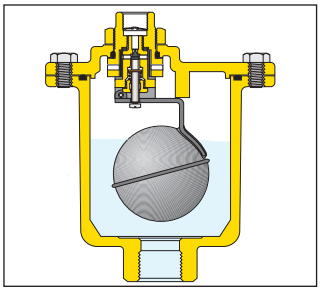
AUTOMATIC AND MANUAL AIR VENTS

Automatic air vents are designed to remove the air that accumulates in heating and cooling systems without the need for manual intervention. This prevents harmful air that may compromise the life and the performance of the system which includes:
- corrosion due to the oxygen;
- pockets of air trapped in the heating emitters;
- cavitation in the circulation pumps;
- noise from air passing through the pipes.

The accumulation of air bubbles in the air vent body causes the float to drop and thus the vent valve to open. The air vent functions correctly, as long as the water pressure remains below the maximum discharge pressure.

MAXCAL®

Extra high capacity air vent is ideal for use in large piping systems and can also be installed in horizontal piping. The valve body and cover are made of forged brass while the filter, valve stem, float and spring are all made of stainless steel to prevent the formation of rust.



501 MAXCAL®

tech. broch. 01090

Automatic air vent for heating and air conditioning. Brass body and cover, stainless steel internal components.
Extra high discharge capacity.
Max. working pressure: 230 psi.
Max. discharge pressure: 90 psi.
Max. discharge rate: 9 SCFM.
Working temperature range: -4 – 250°F.
Discharge top thread: ⅜" female.

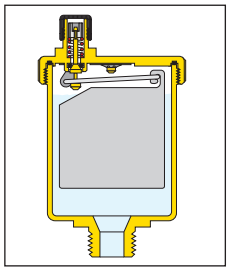
Code	Description	Lbs	USD
501502A	¾" NPT female	7	**404.30**

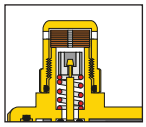
MINICAL® and VALCAL®

These float type automatic air vents are designed to vent released air from the water while being heated. They are used on manifolds or pipes in sealed heating systems.

MINICAL® is a standard size air vent that will discharge up to 1.75 SCFM.

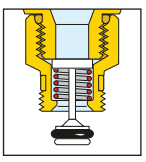
VALCAL® is a high capacity larger size air vent that will discharge up to 2.5 SCFM.





Some MINICAL® and VALCAL® models are equipped with a hygroscopic safety cap. Cellulose fibre discs serve as the redundant vent seal which their volume increases by 50% when they become wet which cause the discharge vent to close.

Some MINICAL® and VALCAL® models are equipped with a service check valve which facilitates maintenance operations by shutting off the water flow when the air vent is removed and also allows an easy replacement of air vent without purging the system.



5020 MINICAL®

tech. broch. 01054

Automatic air vent.
Brass body.
Max. working pressure: 150 psi.
Max. discharge pressure: 40 psi.
Max. discharge rate: 1.75 SCFM.
Max. working temperature: 250°F.

Code	Description	Lbs	USD
502015A	⅛" NPT male	0.4	**22.60**

5021 MINICAL®

tech. broch. 01054

Automatic air vent with service check valve
Brass body.
Max. working pressure: 150 psi.
Max. discharge pressure: 40 psi.
Max. discharge rate: 1.75 SCFM.
Max. working temperature: 230°F.

Code	Description	Lbs	USD
502115A	⅛" NPT male	0.4	**30.50**

5020 MINICAL®

tech. broch. 01054

Automatic air vents.
Brass body.
Hygroscopic safety air vent cap.
Max. working pressure: 150 psi.
Max discharge pressure: 60 psi.
Max. discharge rate: 1.75 SCFM.
Max. working temperature: 250°F.

Code	Description	Lbs	USD
502043A	½" NPT male	0.6	**31.90**

5022 VALCAL®

tech. broch. 01090

High discharge automatic air vent.
Brass body.
Max. working pressure: 150 psi.
Max. discharge pressure: 60 psi.
Max. discharge rate: 2.5 SCFM.
Max. working temperature: 250°F.

Code	Description	Lbs	USD
502243A	½" NPT male	0.5	**54.80**

5023 VALCAL®

tech. broch. 01090

High discharge vent with service check.
Brass body.
Max. working pressure: 150 psi.
Max. discharge pressure: 60 psi.
Max. discharge rate: 2.5 SCFM.
Max. working temperature: 250°F.

Code	Description	Lbs	USD
502343A	½" NPT male	0.5	**64.70**

AUTOMATIC AND MANUAL AIR VENTS

5026

tech. broch. 01090

Automatic air vent.
Brass body.
Max. working pressure: 150 psi.
Max. discharge pressure: 90 psi.
Max. discharge rate: 1.75 SCFM.
Max. working temperature: 240°F.

Code	Description	Lbs	USD
502610A	⅛" NPT male	0.6	**20.30**
502620A	¼" NPT male	0.6	**21.20**
502640	½" straight thread	1.0	**30.50**

5027

tech. broch. 01090

Automatic air vent with service check valve.
Brass body.
Max. working pressure: 150 psi.
Max. discharge pressure: 90 psi.
Max. discharge rate: 1.75 SCFM.
Max. working temperature: 240°F.

Code	Description	Lbs	USD
502710A	⅛" NPT male	0.6	**28.10**
502720A	¼" NPT male	0.6	**29.70**

Service check valve for removal of air vent or expansion tank without purging system.
Fits automatic air vents 502 series.
Max. working pressure: 150 psi.
Max. working temperature: 250°F.

Code	Description	Lbs	USD
59474A	⅛" NPT male	0.1	**15.80**
59804A	¼" NPT male	0.1	**16.90**
561402A	½" NPT male	0.2	**19.50**

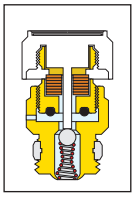
551 DISCALAIR®

tech. broch. 01124

High discharge automatic air vent.
Brass body.
Stainless steel float guide pin and linkage.
Max. working pressure: 150 psi.
Max. discharge pressure: 90 psi.
Max. discharge rate: 4.5 SCFM.
Max. working temperature: 250°F.

Code	Description	Lbs	USD
551004A	½" NPT female	0.8	**124.60**

Automatic radiator air vent valve is designed to remove any air trapped inside the heat emitters both during the filling of the system and in normal operation. The automatic air discharge happens when the hygroscopic cellulose fibre discs are dry. As air is vented and water contacts the hygroscopic discs, they increase their volume by 50% which cause the discharge vent to close.



5080

tech. broch. 01090

Automatic hygroscopic air vent for hydronic heating system and low pressure steam.
Manual operation by rotating knob.
Chrome plated brass body.
Max. working pressure: 150 psi.
Max. working temperature: 212°F.
Low pressure steam: 15 psi.
(Priced each, sold in package of 25 each)

Code	Description	Lbs	USD
508013A	⅛" NPT male	0.1	**11.10**

5081

tech. broch. 01090

Replacement hygroscopic cartridge fits hygroscopic air vent 5080 series.
(Priced each, sold in package of 25 each)

Code	Description	Lbs	USD
508100A	Cartridge	0.1	**9.60**

337

Manual air vent with metal seal and adjustable outlet.
Brass body.
Max. working pressure: 150 psi.
Max. working temperature: 212°F.

Code	Description	Lbs	USD
337221A	¼" NPT male	0.1	**13.70**

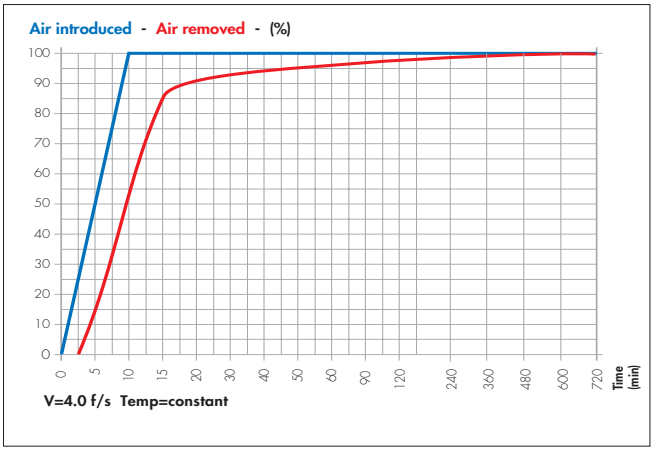
AIR SEPARATORS

The DISCAL® air separator is used to continuously remove the air contained in hydronic circuits of heating and cooling systems. The air discharge capacity is very high. They automatically remove all the air present in the system down to micro-bubble level with low head loss due to the special internal shape of the separator body. Flow direction of the DISCAL® air separator is bidirectional; flow in either direction is permitted.

Air separation efficiency

DISCAL® air separators continuously remove entrained air in hydronic systems with very high separation efficiency. The amount of air removed from a system varies depending on fluid velocity and temperature, As illustrated on the graph below, at the 4.0 feet per second fluid velocity, all the air artificially introduced into the circuit is eliminated by the DISCAL® air separator.

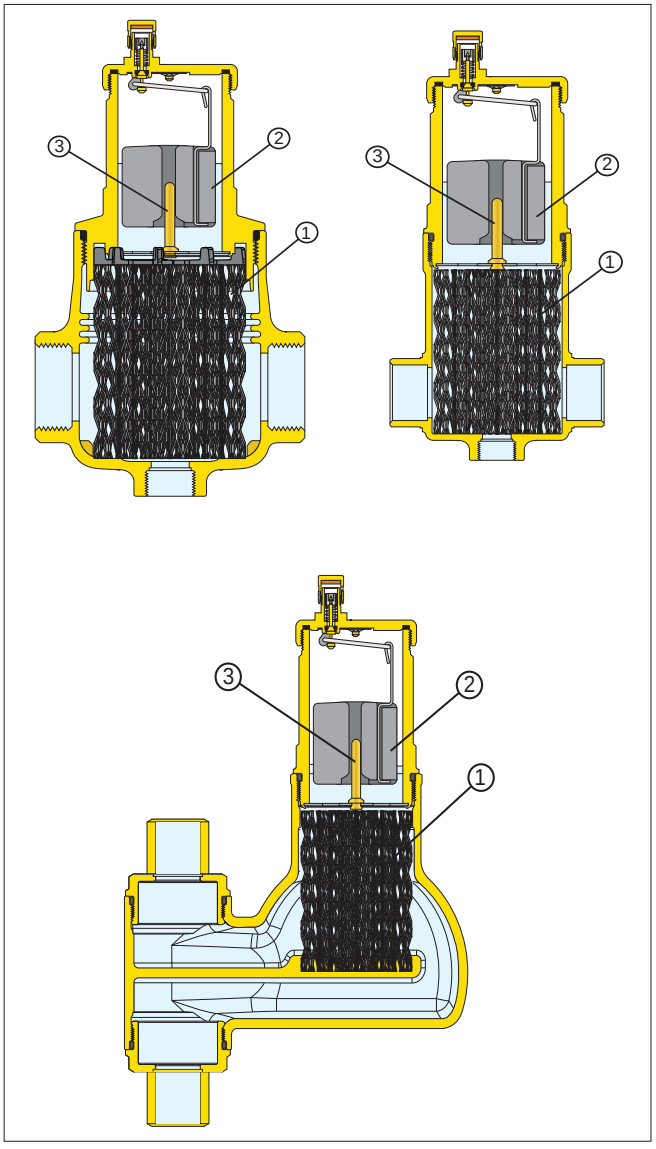
Any small amount which remains is then gradually eliminated during normal system operation. In conditions where the fluid velocity is slower or the temperature of the fluid is higher, the amount of air separated is even greater.



		FLOW RATE				
	Size	¾"	1"	1¼"	1½"	2"
4.0 f/s	GPM	6	9	15	24	36
10.0 f/s	GPM	19	22	36	57	66
	Cv	19	32	56	73	81

Construction details

The air separator uses the combined action of several physical principles. The active part consists of an assembly of concentric mesh surfaces (1). These elements create the whirling movement required to facilitate the release of microbubbles and their adhesion to these surfaces. The bubbles, fusing with each other, increase in size until the hydrostatic thrust overcomes the adhesion force to the mesh. They rise towards the top of the unit from which they are released through a float-operated automatic air vent, with stainless steel float guide pin (3) which keeps the float (2) from binding.



AIR SEPARATORS

551 DISCAL® Sweat

tech. broch. 01060

Air separator.
Brass body.
Stainless steel float guide pin and linkage.
Glass reinforced nylon internal element.
½" NPT female bottom thread.
Max. working pressure: 150 psi.
Working temperature range: 32—250°F.

Code	Description	Lbs	USD
551028A	1" sweat	3.7	**274.70**
551035A	1¼" sweat	3.7	**401.00**
551041A	1½" sweat	4.9	**522.00**
551054A	2" sweat	5.5	**637.00**

551 DISCAL® Sweat

tech. broch. 01060

Air separator with ½" service check valve (code 561402A) to mount expansion tank on bottom thread.
Brass body.
Stainless steel float guide pin and linkage.
Glass reinforced nylon internal element.
Max. working pressure: 150 psi.
Working temperature range: 32—250°F.

Code	Description	Lbs	USD
551028AC	1" sweat	3.8	**284.50**
551035AC	1¼" sweat	3.8	**410.80**
551041AC	1½" sweat	5.0	**531.80**
551054AC	2" sweat	5.6	**646.80**

Service check valve for easy replacement of expansion tank when connected to bottom of DISCAL®.

Code	Description	Lbs	USD
561402A	½" NPT male x ½" NPT female	0.2	**19.50**

Insulation shell fits DISCAL® 551 series.

Code	Description	Lbs	USD
CBN551005	Fits ¾"* and 1" 551 series	0.1	**73.50**
CBN551007	Fits 1¼", 1½" 551 series	0.1	**78.80**
CBN551009	Fits 2" 551 series	0.1	**86.10**

*Will not fit the ¾" compact DISCAL®, codes 551003A and 551022A.

551 DISCAL® NPT

tech. broch. 01060

Air separator.
Brass body.
Stainless steel float guide pin and linkage.
Glass reinforced nylon internal element.
½" NPT female bottom thread.
Max. working pressure: 150 psi.
Working temperature range: 32—250°F.

Code	Description	Lbs	USD
551005A	¾" NPT female	3.7	**261.00**
551006A	1" NPT female	3.7	**288.30**
551007A	1¼" NPT female	4.9	**421.10**
551008A	1½" NPT female	4.9	**548.00**
551009A	2" NPT female	5.5	**669.00**

551 DISCAL® NPT

tech. broch. 01060

Air separator with automatic ½" check valve (code 561402A) to mount expansion tank on bottom thread.
Brass body.
Stainless steel float guide pin and linkage.
Glass reinforced nylon internal element.
Max. working pressure: 150 psi.
Working temperature range: 32—250°F.

Code	Description	Lbs	USD
551005AC	¾" NPT female	3.8	**270.80**
551006AC	1" NPT female	3.8	**298.10**
551007AC	1¼" NPT female	5.0	**430.90**
551008AC	1½" NPT female	5.0	**557.80**
551009AC	2" NPT female	5.6	**678.80**

551 DISCAL® Press

tech. broch. 01060

Air separator.
Brass body.
Stainless steel float guide pin and linkage.
Glass reinforced nylon internal element.
Max. working pressure: 150 psi.
Working temperature range: 32—250°F.

Code	Description	Lbs	USD
551066A	1" Press	3.8	**328.30**
551066AC	1" Press with check valve	3.9	**338.10**
551067A	1¼" Press	5.0	**505.10**
551067AC	1¼" Press with check valve	5.1	**514.90**

AIR SEPARATORS

551 DISCAL® Compact

tech. broch. 01060

Air separator.
Brass body.
Stainless steel float guide pin and linkage.
Stainless steel mesh internal element.
½" NPT bottom thread.
Max. working pressure: 150 psi.
Working temperature range: 32—250°F.

Code	Description	Lbs	USD
551003A	¾" NPT female	2.0	**157.90**
551022A	¾" sweat	2.0	**152.40**

551 DISCAL® Compact

tech. broch. 01060

Air separator with ½" service check valve to mount expansion tank on bottom thread.
Brass body.
Stainless steel float guide pin and linkage.
Stainless steel mesh internal element.
Max. working pressure: 150 psi.
Working temperature range: 32—250°F.

Code	Description	Lbs	USD
551003AC	¾" NPT female	2.1	**167.70**
551022AC	¾" sweat	2.1	**162.20**

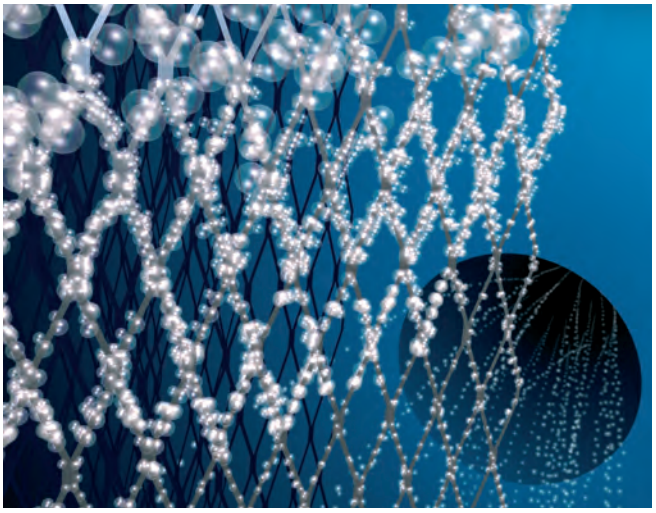
551 DISCAL® Vertical

tech. broch. 01060

Air separator for vertical pipes.
Brass body.
Stainless steel float guide pin and linkage.
Stainless steel mesh internal element.
Max. working pressure: 150 psi.
Working temperature range: 32—250°F.

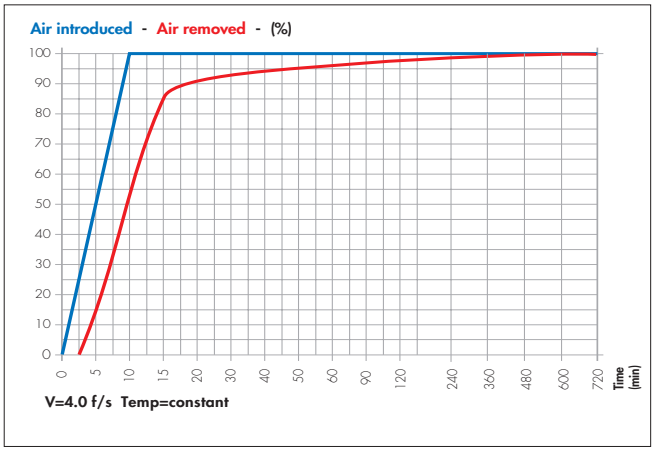
Code	Description	Lbs	USD
NA551995	¾" sweat	4.5	**337.30**
NA551996	1" sweat	4.5	**372.60**

The DISCAL® air separator uses a coalescing element that consists of an element of concentric diamond pattern mesh surfaces. This element creates the whirling movement required to facilitate the release of micro-bubbles and their adhesion to these surfaces. The bubbles, fusing with each other, increase in volume until the bouyancy force overcomes the adhesion force to the surface. They rise to the top of the unit from where they are released through a float-operated automatic air release valve.



Air separation efficiency

DISCAL® air separators continuously remove entrained air in hydronic systems with very high separation efficiency. The amount of air removed from a system varies depending on fluid velocity and temperature. As illustrated on the graph, at the 4.0 feet per second fluid velocity, all the air artificially introduced into the system is gradually eliminated during normal system operation by the DISCAL® air separator. In conditions where the fluid velocity is slower or the temperature of the fluid is higher, the amount of air separated is even faster.



		FLOW RATE		
	Size	¾" compact	¾" vertical	1" vertical
4.0 f/s	GPM	6	9	9
10.0 f/s	GPM	14	20	20
	Cv	12	19	19

AIR SEPARATORS

551 DISCAL®

tech. broch. 01060

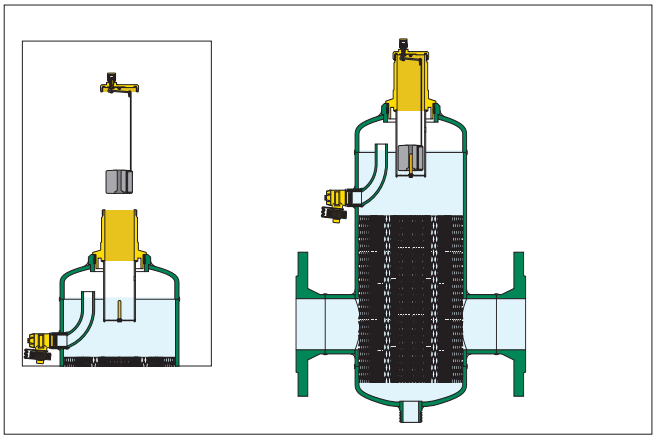
Air separator.
Epoxy resin coated steel body.
Stainless steel float guide pin and linkage.
Stainless steel mesh internal element.
ANSI 150 flange connections.
1" NPT male drain thread.
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.

Code	Description	Lbs	USD
551050A	2" ANSI flange	34	**2,875.00**
551060A	2½" ANSI flange	35	**3,074.00**
551080A	3" ANSI flange	62	**4,069.00**
551100A	4" ANSI flange	67	**4,552.00**
551120A	5" ANSI flange	106	**6,625.00**
551150A	6" ANSI flange	117	**8,536.00**

Air separator construction

DISCAL® air separators are constructed to allow maintenance and cleaning operations to be carried out without having to remove the separator body from the pipe work. All DISCAL® air separator have a bottom connection for installing a drain valve. All internal air release control components are fully accessible. The automatic air release valve, located at the top of the separator, has a long chamber for the movement of the float. This feature prevents any debris present in the water from reaching the sealing seat.

Flanged models include a side drain vent to release large amounts of air when filling the system and to remove any debris present above the water level.



		FLOW RATE								
	Size	2"	2½"	3"	4"	5"	6"	8"	10"	12"
4.0 f/s	GPM	37	63	96	149	259	380	625	980	1,410
10.0 f/s	GPM	89	150	227	355	816	904	1,570	2,450	3,530
	Cv	87	174	208	324	520	832	1,109	1,387	1,664

NA551 DISCAL® ASME/CRN

tech. broch. 01060

Air separator.
Epoxy resin coated steel body.
Stainless steel float guide pin and linkage.
Stainless steel mesh internal element.
ANSI 150 flange connections.
1" NPT male drain connection.
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.
ASME and CRN registered.

Code	Description	Lbs	USD
NA551050A	2" ANSI flange ASME & CRN	34	**3,514.00**
NA551060A	2½" ANSI flange ASME & CRN	35	**3,757.00**
NA551080A	3" ANSI flange ASME & CRN	62	**4,973.00**
NA551100A	4" ANSI flange ASME & CRN	67	**5,564.00**
NA551120A	5" ANSI flange ASME & CRN	106	**8,097.00**
NA551150A	6" ANSI flange ASME & CRN	117	**10,433.00**

NA prefix indicates ASME tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors; CRN registered.

NA551 DISCAL® ASME

tech. broch. 01060

Air separator.
Epoxy resin coated steel body.
Stainless steel float guide pin and linkage.
Stainless steel mesh internal element.
ANSI 150 flange connections.
2" NPT male drain connection.
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.
ASME registered. CRN registration pending.

Code	Description	Lbs	USD
NA551200A	8" ANSI flange ASME & CRN	335	**18,779.00**
NA551250A	10" ANSI flange ASME & CRN	617	**28,169.00**
NA551300A	12" ANSI flange ASME & CRN	871	**36,619.00**

NA prefix indicates ASME tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors.

Optional drain ball valve.
Fits DISCAL® series.
Brass body.
Tee handle.
Max. working pressure: 150 psi.
Max. working temperature: 365°F.

Code	Description	Cv	Lbs	USD
NA39753	1" NPT female T handle	50	0.7	**54.50**
NA59600	2" NPT female w/Lever	309	3.5	**195.50**

AIR AND DIRT SEPARATORS

The **DISCALDIRT®** air and dirt separator uses a coalescing element that consists of an assembly of concentric diamond pattern mesh surfaces. This element creates the whirling movement required to facilitate the release of micro-bubbles and their adhesion to these surfaces. The bubbles, fusing with each other, increase in volume until the bouyancy force overcomes the adhesion force to the surface. They rise towards the top of the unit and are released through a float-operated automatic air release valve.

The dirt separating action performed by the same element which offers little resistance to the medium flow while ensuring dirt separation. The particles collide with the concentric diamond pattern mesh surfaces and then settle to the bottom, and not by filtration unlike mesh strainers; which, over time, get progressively clogged. By contrast, the DISCALDIRT®'s low-velocity-zone dirt separator function efficiently removes the particles to as small as 5µm (0.2 mil) with very low head loss. The dirt can then be removed through the bottom drain port.

546 DISCAL DIRT®

tech. broch. 01123

Air & Dirt separator.
Brass body.
Stainless steel float guide pin and linkage.
Glass reinforced nylon internal element.
Max. working pressure: 150 psi.
Working temperature range: 32—250°F.
Particle separation capacity: to 5 µm (0.2 mil).

Code	Description	Lbs	USD
546096A	1" sweat	8.3	**463.00**
546016A	1" NPT male	8.3	**486.00**
546097A	1¼" sweat	8.3	**552.00**

The **DISCALDIRTMAG™** air and dirt separator with magnet uses an external magnet ring for separation of ferrous impurities. The external magnet allows greater effectiveness in the separation and collection of ferrous impurities. The impurities are retained in the body of the dirt separator by the strong magnetic field created by magnets in its external outer ring. The outer ring is removable from the body to allow the flushing of sludge, with the system still running. Since the magnetic ring is positioned outside the body of the dirt separator, it does not interfere with the flow through the device.

5461 DISCAL DIRTMAG™

tech. broch. 01287

Air & Dirt separator with magnet.
Brass body.
Stainless steel float guide pin and linkage.
Glass reinforced nylon internal element.
Max. working pressure: 150 psi.
Working temperature range: 32—250°F.
Particle separation capacity: to 5 µm (0.2 mil).
Ferrous impurities separation efficiency: 100%.

PCT INTERNATIONAL APPLICATION PENDING

Code	Description	Lbs	USD
546195A	¾" sweat	8.5	**486.50**
546196A	1" sweat	8.5	**554.00**
546116A	1" NPT male	8.5	**578.00**
546197A	1¼" sweat	8.5	**659.00**

546 DISCAL DIRT®

tech. broch. 01123

Air & Dirt separator.
Epoxy resin coated steel body.
Stainless steel float guide pin and linkage.
Stainless steel mesh internal element.
ANSI 150 flange connections.
Complete with drain valve (NA39753)
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.
Particle separation capacity: to 5 µm (0.2 mil).

Code	Description	Lbs	USD
546050A	2" ANSI flange	40	**3,651.00**
546060A	2½" ANSI flange	42	**3,848.00**
546080A	3" ANSI flange	73	**4,956.00**
546100A	4" ANSI flange	78	**5,433.00**
546120A	5" ANSI flange	181	**7,837.00**
546150A	6" ANSI flange	188	**9,562.00**

May 2016

5461 DISCAL DIRTMAG™

tech. broch. 01287

Air & Dirt separator with magnet.
Epoxy resin coated steel body.
Stainless steel float guide pin and linkage.
Stainless steel mesh internal element.
Complete with union connections.
Max. working pressure: 150 psi.
Working temperature range: 32 — 230°F
Particle separation capacity: to 5 µm (0.2 mil).
Ferrous impurities separation efficiency: 100%.

Code	Description	Lbs	USD
546198A	1½" sweat union	22	**1,633.00**
546108A	1½" NPT female union	22	**1,680.00**
546168A	1½" Press union	22	**1,780.00**
546199A	2" sweat union	23	**1,711.00**
546109A	2" NPT female union	23	**1,775.00**
546169A	2" Press union	23	**1,985.00**

Insulation shell fits brass DISCALDIRT® 546 only.

Code	Description	Pk	Lbs	USD
CBN546002	Fits ¾", 1", 1¼"	1	0.1	**115.50**

		FLOW RATE				
	Size	¾"	1"	1¼"	1½"	2"
4.0 f/s	GPM	8	9	10	15	25
10.0 f/s	GPM	14	22	30	40	75
	Cv	19	32	40	50	79

AIR AND DIRT SEPARATORS

NA546 DISCAL DIRT® ASME/CRN

tech. broch. 01123

Air & Dirt separator.
Epoxy resin coated steel body.
Stainless steel float guide pin and linkage.
Stainless steel mesh internal element.
2" threaded NPT connection.
ANSI 150 flange connections.
Complete with drain valve (NA39753)
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.
Particle separation capacity: to 5 µm (0.2 mil).
ASME and CRN registered.

Code	Description	Lbs	USD
NA546050T	2" Threaded ASME & CRN	28	**3,496.00**
NA546060A	2½" ANSI flange ASME & CRN	42	**4,703.00**
NA546080A	3" ANSI flange ASME & CRN	73	**6,057.00**
NA546100A	4" ANSI flange ASME & CRN	78	**6,640.00**
NA546120A	5" ANSI flange ASME & CRN	181	**9,579.00**
NA546150A	6" ANSI flange ASME & CRN	188	**11,687.00**

ASME U-stamp tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors; CRN registered.

NA546 DISCAL DIRT® ASME/CRN

tech. broch. 01123

Air & Dirt separator.
Epoxy resin coated steel body.
Stainless steel float guide pin and linkage.
Stainless steel mesh internal element.
ANSI 150 flange connections.
Complete with drain valve (NA59600)
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.
Particle separation capacity: to 5 µm (0.2 mil).
ASME and CRN registered.

Code	Description	Lbs	USD
NA546200A	8" ANSI flange ASME & CRN	355	**22,684.00**
NA546250A	10" ANSI flange ASME & CRN	555	**33,882.00**
NA546300A	12" ANSI flange ASME & CRN	825	**43,615.00**
NA546350A	14" ANSI flange ASME & CRN	950	**55,150.00**

ASME U-stamp tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors; CRN registered.

		FLOW RATE									
	Size	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"
4.0 f/s	GPM	37	63	95	149	259	380	625	980	1,410	1,950
10.0 f/s	GPM	89	150	227	355	816	904	1,570	2,450	3,530	4,550
	Cv	87	174	208	324	520	832	1,109	1,387	1,664	1,967

NA546 DISCAL DIRTMAG® ASME

tech. broch. 01287

Air & Dirt separator with magnet.
Epoxy resin coated steel body.
Stainless steel float guide pin and linkage.
Stainless steel mesh internal element.
ANSI 150 flange connections.
2" threaded NPT connection.
Complete with drain valve (NA39753)
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.
Particle separation capacity: to 5 µm (0.2 mil).
Ferrous impurities separation efficiency: 100%.
ASME registered. CRN registration pending.

PCT INTERNATIONAL APPLICATION PENDING

Code	Description	Lbs	USD
NA546050TM	2" Threaded ASME	31	**4,195.00**
NA546060AM	2½" ANSI flange ASME	45	**5,644.00**
NA546080AM	3" ANSI flange ASME	76	**7,268.00**
NA546100AM	4" ANSI flange ASME	81	**7,968.00**
NA546120AM	5" ANSI flange ASME	184	**11,494.00**
NA546150AM	6" ANSI flange ASME	191	**14,024.00**

ASME U-stamp tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors registered.

DISCALDIRTMAG® separators offer highly efficient separation of air and dirt as well as magnetite. The magnetite is captured by a concentrated magnetic field created by a stack of neodymium rare-earth magnets positioned inside a brass dry-well which is below the flow stream. Non-magnetic dirt particles are separated by colliding with an internal element in the flow stream and settling to the bottom. The deep collection chamber keeps the dirt from re-entering the flow stream.

DIRT & MAGNETIC DIRT SEPARATORS

The dirt separating action performed by the DIRTCAL® is based on using the internal element with concentric diamond pattern mesh surfaces instead of a mechanical filter. The element offers little resistance to the medium flow while ensuring dirt separation. This occurs due to the particles colliding with the concentric diamond pattern mesh surfaces and then settling to the bottom, and not by filtration; which, over time, gets continuously clogged. By contrast, the DIRTCAL® low-velocity-zone dirt separator requiring a pressure drop 25% or less that of a comparable Y-strainer depending on mesh size and amount of filtered debris and efficiently removes the particles to as small as 5 µm (0.2 mil) with very low head loss. The dirt collection chamber at the bottom of the DIRTCAL® is at the optimal distance from the inlet and outlet connections that the collected dirt particles are not affected by the swirling flow through the mesh element. The dirt can then be removed through the bottom drain port even with the system running, by opening the drain valve. **Low head losses and performance are maintained over time.**

5462 DIRTCAL®

tech. broch. 01137

Dirt separator.
Brass body.
½" NPT top thread with plug for optional air vent, code 502243A.
Max. working pressure: 150 psi.
Working temperature range: 32—250°F.
Particle separation capacity: to 5 µm (0.2 mil).

Code	Description	Lbs	USD
546205A	¾" NPT female	4.2	**243.50**
546228A	1" sweat	4.2	**256.40**
546206A	1" NPT female	4.2	**269.20**
546266A	1" Press	4.5	**309.20**
546235A	1¼" sweat	4.2	**373.50**
546207A	1¼" NPT female	5.3	**392.20**
546267A	1¼" Press	5.6	**476.20**
546241A	1½" sweat	4.9	**483.60**
546208A	1½" NPT female	6.2	**508.00**
546254A	2" sweat	5.5	**595.00**
546209A	2" NPT female	6.2	**624.00**

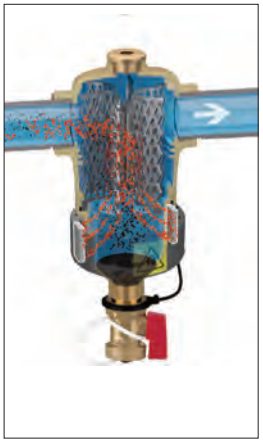
Replacement drain valve fits DIRTCAL® 5462 series.
Brass body.
Max. working pressure: 150 psi.
Max. working temperature: 250°F.

Code	Description	Lbs	USD
538402 FD	½" NPT male x ¾" GHT	0.3	**19.40**

		FLOW RATE				
	Size	¾"	1"	1¼"	1½"	2"
4.0 f/s	GPM	6	9	15	24	36
	Cv	19	32	56	73	81

The versatile DIRTMAG® magnetic dirt separator removes both magnetic and non-magnetic particles continuously. In addition to removing sand and rust is ferrous with a glass-reinforced nylon internal element in a low-velocity-zone chamber, the DIRTMAG® features a powerful removable external magnet around the body below the flow line for fast and effective capture of ferrous particles. The DIRTMAG® has the magnet positioned externally to maintain low pressure loss, and removes up to 100% of the ferrous impurities that can form in a hydronic system.

The DIRTMAG® can be fitted with optional insulated covers, code CBN5462xx series purchased separately, to minimize heat loss.



5463 DIRTMAG®

tech. broch. 01137

Dirt separator with magnet.
Brass body.
½" NPT top thread with plug.
Max. working pressure: 150 psi.
Working temperature range: 32—250°F.
Particle separation capacity: to 5 µm (0.2 mil).
Ferrous impurities separation efficiency: 100%.

PCT INTERNATIONAL APPLICATION PENDING

Code	Description	Lbs	USD
546328A	1" sweat	4.2	**308.60**
546306A	1" NPT female	4.2	**324.00**
546366A	1" Press	4.5	**351.50**
546335A	1¼" sweat	4.2	**450.60**
546307A	1¼" NPT female	5.3	**473.10**
546367A	1¼" Press	5.6	**538.90**
546341A	1½" sweat	4.9	**587.00**
546308A	1½" NPT female	6.2	**616.00**
546354A	2" sweat	5.5	**716.00**
546309A	2" NPT female	6.2	**743.00**

Insulation shell fits DIRTCAL® 5462 and DIRTMAG® 5463 series.
Labels included for field installation to externally identify product use.

Code	Description	Lbs	USD
CBN546205	Fits ¾" & 1" DIRTCAL®, DIRTMAG®	0.1	**73.50**
CBN546207	Fits 1¼" & 1½" DIRTCAL®, DIRTMAG®	0.1	**78.80**
CBN546209	Fits 2" DIRTCAL®, DIRTMAG®	0.1	**86.10**

MAGNETIC DIRT SEPARATORS

NA5453 tech. broch. 01240

DIRTMAG®

Dirt separator with magnet.
Brass mounting housing.
Composite PA66G30 body.
Max. working pressure: 45 psi.
Working temperature range: 32—195°F.
Particle separation capacity: to 5 µm (0.2 mil).
Ferrous impurities separation efficiency: 100%.
Union isolation ball valves.
Drain valve with hose connection.
Top dosing point port.
Dosing capacity: 12 fluid oz.
Manual screw air vent.

PCT INTERNATIONAL APPLICATION PENDING

Code	Description	Lbs	USD
NA545355	¾" union NPT with isolation valves	5.5	**318.80**
NA545356	1" union NPT with isolation valves	5.5	**372.80**

		FLOW RATE	
	Size	¾"	1"
4.0 f/s	GPM	8	9
	Cv	12	19

This multifunction device can also be used as a dosing point to inject chemical additives into the circuit.

Use a screwdriver to undo the screw on the top plug in order to purge any air that has collected at the top of the body.

NA5453 tech. broch. 01240

DIRTMAG®

Dirt separator with magnet.
Brass mounting housing.
Composite PA66G30 body.
Max. working pressure: 45 psi.
Working temperature range: 32—195°F.
Particle separation capacity: to 5 µm (0.2 mil).
Ferrous impurities separation efficiency: 100%.
Drain valve with hose connection.
Top dosing point port.
Dosing capacity: 12 fluid oz.
Manual screw air vent.

PCT INTERNATIONAL APPLICATION PENDING

Code	Description	Lbs	USD
NA545305	¾" union NPT	4.5	**266.60**
NA545365	¾" union press	4.5	**288.60**
NA545395	¾" union sweat	4.5	**264.60**
NA545306	1" union NPT	4.5	**306.90**
NA545366	1" union press	4.7	**346.90**
NA545396	1" union sweat	4.5	**292.30**

The dirt separator with magnet combines the action of the internal element and magnet. The impurities in the water strike the internal element and are separated, dropping into the bottom of the body where they are collected.
Ferrous impurities are also trapped inside the dirt separator body by two strong magnets inserted into removable outer ring collar. The collected impurities are discharged by removing the external ring magnet and opening the drain valve, this procedure can even be performed while the system is in operation.

The special coupling between the locking nut and the mounting base allows the DIRTMAG® dirt separator to be rotated for installation to either vertical or horizontal pipes, while maintaining the same operating performance.

DIRT SEPARATORS

The dirt separating action performed by the DIRTCAL® is based on using the internal element with concentric diamond pattern mesh surfaces instead of a mechanical filter. The element offers little resistance to the medium flow while ensuring dirt separation. This occurs due to the particles colliding with the concentric diamond pattern mesh surfaces and then settling to the bottom, and not by filtration; which, over time, gets continuously clogged. By contrast, the DIRTCAL® low-velocity-zone dirt separator efficiently removes the particles to as small as 5 µm (0.2 mil) with very low head loss. The dirt collection chamber at the bottom of the DIRTCAL® is at the optimal distance from the inlet and outlet connections that the collected dirt particles are not affected by the swirling flow through the mesh element. The dirt can then be removed through the bottom drain port even with the system running, by opening the drain valve.
Low head losses and performance are maintained over time.

5465 DIRTCAL®

tech. broch. 01137

Dirt separator.
Epoxy resin coated steel body.
Complete with drain valve (code NA39753).
¾" NPT male top thread with brass cap.
ANSI 150 flange connections.
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.
Particle separation capacity: to 5 µm (0.2 mil).

Code	Description	Lbs	USD
546550A	2" ANSI flange	29	**1,944.00**
546560A	2½" ANSI flange	32	**2,091.00**
546580A	3" ANSI flange	51	**2,828.00**
546510A	4" ANSI flange	54	**3,128.00**

Drain ball valve.
Fits DIRTCAL® 5465 and NA5465 series.
Brass body.
Tee handle.
Max. working pressure: 150 psi.
Max. working temperature: 365°F.

Code	Description	Cv	Lbs	USD
NA39753	1" NPT female T handle	50	0.7	**54.50**

		FLOW RATE					
	Size	2"	2½"	3"	4"	5"	6"
4.0 f/s	GPM	37	63	95	149	259	380
10.0 f/s	GPM	89	150	227	355	816	904
	Cv	88	176	211	328	520	842

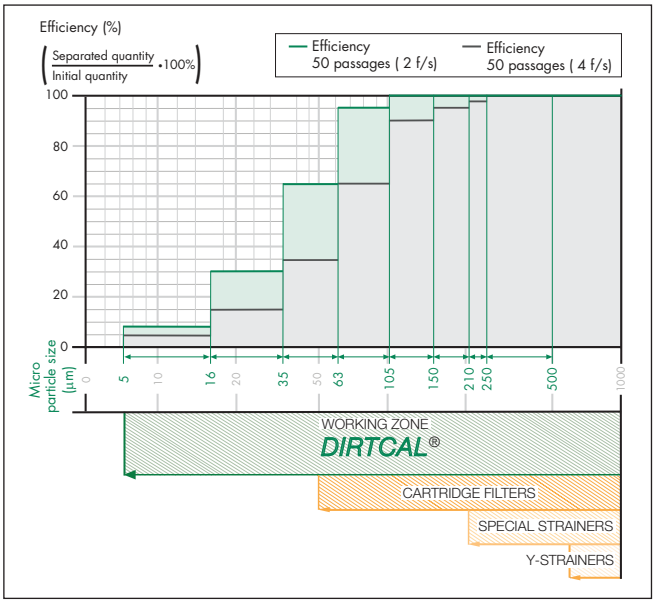
NA5465 DIRTCAL® ASME/CRN

tech. broch. 01137

Dirt separator.
Epoxy resin coated steel body.
Complete with drain valve (code NA39753).
¾" NPT male top thread with brass cap.
ANSI 150 flange connections.
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.
ASME and CRN registered.
Particle separation capacity: to 5 µm (0.2 mil).

Code	Description	Lbs	USD
NA546550A	2" ANSI flange ASME & CRN	38	**3,014.00**
NA546560A	2½" ANSI flange ASME & CRN	38	**3,207.00**
NA546580A	3" ANSI flange ASME & CRN	55	**4,176.00**
NA546510A	4" ANSI flange ASME & CRN	55	**4,570.00**
NA546512A	5" ANSI flange ASME & CRN	138	**6,589.00**
NA546515A	6" ANSI flange ASME & CRN	148	**8,452.00**

Dirt separation efficiency



MAGNETIC DIRT SEPARATORS

Ferrous and non ferrous impurities in hydronic systems can deposit onto heat exchanger surfaces and accumulate in pump cavities causing reduced thermal efficiency and premature wear. The small and often microscopic magnetic particles, called magnetite, form when iron or steel corrodes. Highly abrasive, the extremely fine particles are difficult to remove by traditional means. DIRTMAG® separators offer highly efficient separation of typical dirt as well as magnetite. The magnetite is captured by a concentrated magnetic field created by a stack of neodymium rare-earth magnets positioned inside a brass dry-well which is below the flow stream. Non-magnetic dirt particles are separated by colliding with an internal element in the flow stream and settling to the bottom. The deep collection chamber keeps the dirt from re-entering the flow stream.

To purge the debris, the flexible magnetic stack is removed from the brass dry-well and, even while the system is still running, the drain valve is opened. Aided by the system pressure, the dirt and magnetite flushes out quickly and effectively. DIRTMAG® magnetic dirt separators accomplish 2½ times the Ferrous impurities removal performance of standard dirt separators, delivering up to 100% elimination efficiency.

NA5465

tech. broch. 01137

DIRTMAG®

Dirt magnetic separator.
Epoxy resin coated steel body.
Complete with drain valve (code NA39753).
¾" NPT male top thread with brass cap.
ANSI 150 flange connections.
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.
ASME registered. CRN registration pending.
Particle separation capacity: to 5 µm (0.2 mil).
Ferrous impurities separation efficiency: 100%.

PCT INTERNATIONAL APPLICATION PENDING

Code	Description	Lbs	USD
NA546550AM	2" ANSI flange ASME	41	**3,617.00**
NA546560AM	2½" ANSI flange ASME	41	**3,849.00**
NA546580AM	3" ANSI flange ASME	58	**5,011.00**
NA546510AM	4" ANSI flange ASME	58	**5,484.00**
NA546512AM	5" ANSI flange ASME	141	**7,906.00**
NA546515AM	6" ANSI flange ASME	151	**10,142.00**

5465

tech. broch. 01137

DIRTMAG®

Dirt magnetic separator.
Epoxy resin coated steel body.
Complete with drain valve (code NA39753).
¾" NPT male top thread with brass cap.
ANSI 150 flange connections.
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.
Particle separation capacity: to 5 µm (0.2 mil).
Ferrous impurities separation efficiency: 100%.

PCT INTERNATIONAL APPLICATION PENDING

Code	Description	Lbs	USD
546550AM	2" ANSI flange	41	**2,430.00**
546560AM	2½" ANSI flange	41	**2,614.00**
546580AM	3" ANSI flange	58	**3,535.00**
546510AM	4" ANSI flange	58	**3,910.00**

		FLOW RATE					
	Size	2"	2½"	3"	4"	5"	6"
4.0 f/s	GPM	37	63	95	149	259	380
	Cv	88	176	211	328	520	842

ACCESSORIES FOR AIR AND DIRT SEPARATORS

tech. broch. 01054

Hygroscopic air vent cap fits DISCAL® 551, and DISCALDIRT® 546 series, and MINICAL® 502 series.

Code	Description	Lbs	USD
R59681	Vent cap	0.1	**24.00**

tech. broch. 01054

Anti-suction air vent cap fits DISCAL® 551, DISCALDIRT® 546 series and MINICAL® 502 series.

Code	Description	Lbs	USD
562100	Vent cap	0.1	**25.40**

tech. broch. 01060

Replacement air vent cap fits DISCAL® 551 and DISCALDIRT® 546 series.

Code	Description	Lbs	USD
R59119	Vent cap	0.1	**16.00**

Replacement plastic cap fits MINICAL® 5020 and 5021 series.

Code	Description	Lbs	USD
R56214	Vent cap	0.1	**2.60**

Replacement plastic air vent cap fits 5026 and 5027 series.

Code	Description	Lbs	USD
R56142	Vent cap	0.1	**2.50**

tech. broch. 01060

Replacement air vent assembly fits DISCAL® brass 551 series (except Compact), brass 546, 5461 series and SEP4™ 5495 series.

Code	Description	Lbs	USD
59829	Air vent	2.0	**154.50**

tech. broch. 01060

Replacement air vent assembly fits steel 551, NA551 steel DISCAL® and 546 steel series DISCAL DIRT® and DISCALDIRTMAG® .

Code	Description	Lbs	USD
59756	Air vent	3.0	**199.80**

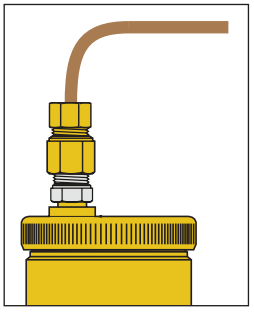
Replacement cover and float fits DISCAL® brass 551 series and DISCALDIRT® brass 546 series.
Vent cap sold separately.

Code	Description	Lbs	USD
F39807	Cover and float	0.4	**75.60**

tech. broch. 01133

Vent cap adapter fits all air separators and air vents except 5026 and 5027 series

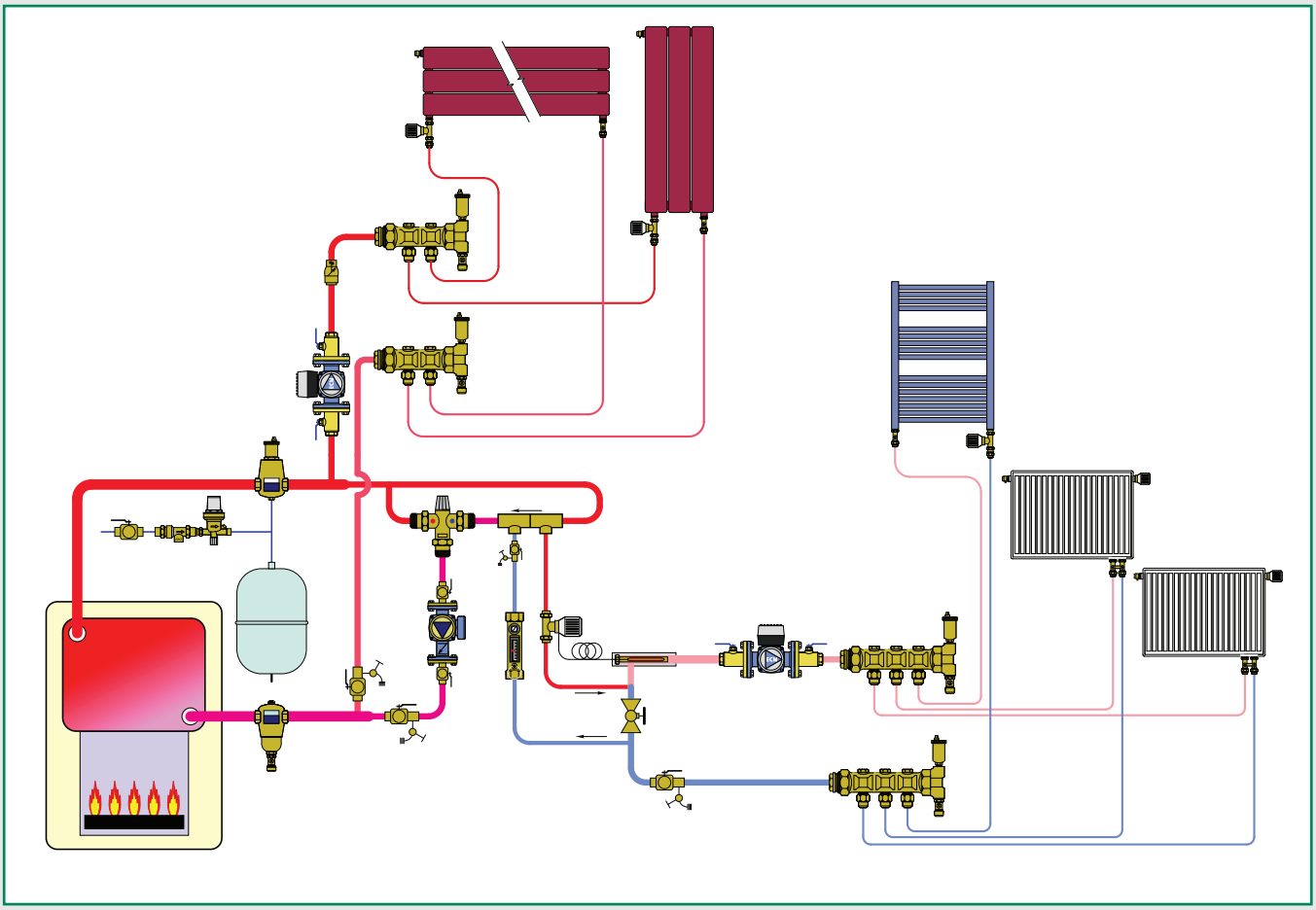
Code	Description	Lbs	USD
NA10204	¼" NPT male	0.1	**27.30**



Vent cap adapter NA10204 replaces the air vent cap which provides a ¼" male NPT thread which can be used to connect a discharge tube with separate fittings.

THERMOSTATIC RADIATOR VALVES AND ACCESSORIES

This diagram is an example



Thermostatic control heads

Accessories for thermostatic control heads

Thermostatic radiator valve bodies

Towel warmer radiator valves

Connection valves for panel style radiators

Connection fittings

THERMOSTATIC CONTROL HEADS

200

tech. broch. 01034

Thermostatic control head fits radiator valves.
Set point locking mechanism.
Range stop adjustment.
Built-in sensor with liquid-filled element.
Fits valve 220, 221, 338 and 339 series.
Graduated scale from * to 5 corresponding to a temperature scale adjustment range of 45—82ºF (7—28ºC).

Code	Description	Lbs	USD
200000	Built-in sensor	0.5	**76.20**

201

tech. broch. 01034

Thermostatic control head fits radiator valves.
With remote sensor.
Fits valve 220, 221, 338 and 339 series.
Graduated scale from * to 5 corresponding to a temperature scale adjustment range of 45—82ºF (7—28ºC).
Capillary length: 78" (2 m).

Code	Description	Lbs	USD
201000	Remote sensor	1	**136.50**

472

tech. broch. 01034

Thermostatic control head with remote adjusting knob, liquid-filled element.
Fits valves 220, 221, 338, 339 & 676 series (direct coupling).
Temperature range: 43—82°F (6—28°C).
Capillary length: 78 in. (2 m.)

Code	Description	Lbs	USD
472000	Remote wall sensor	1	**260.20**

203

tech. broch. 01034

Thermostatic control head fits radiator valves; with contact probe.
Built-in sensor with liquid-filled element.
Fits valve 220, 221, 338 and 339 series.
The pre-set scale corresponds to adjustment temperature range of 68—122ºF (20—50ºC).
Capillary length: 78" (2 m).

Code	Description	Lbs	USD
203502	Remote sensor probe	0.5	**258.30**

ACCESSORIES

209

tech. broch. 01034

Tamper-proof cap for public installations.
Fits thermostatic control head 200 and 201 series.
To be used with special hex key code 209001.

Code	Description	Lbs	USD
209000	Tamper proof cap	0.1	**26.30**

209

tech. broch. 01034

Special hex key fits tamper-proof cap.
To be used with tamper-proof caps 209 series.

Code	Description	Lbs	USD
209001	Hex key	0.1	**10.50**

NA475

Pocket well fits 203502.
Length: 7 3/8" (187 mm).

Code	Description	Lbs	USD
NA475002	¾" NPT male	0.2	**45.20**

THERMO-ELECTRIC ACTUATOR

6564

tech. broch. 01198

Thermo-electric actuator for electric control of radiator valves.
Fits valves 220, 221, 338 and 339 series.
Low current draw.
Power supply: 24 V AC/DC.
Initial current draw: ≤ 250 mA.
Power consumption: 3 W, 6 VA.
31.5" wire lead connection.

Code	Description	Lbs	USD
656404	24 V AC/DC	0.4	**103.30**
656414	24 V AC/DC with microswitch	0.4	**129.20**

4490

Manual knob for thermostatic radiator valves. Fits valves 220 and 221 series.

Code	Description	Lbs	USD
449010	Manual knob	0.1	**15.80**

NPT THERMOSTATIC RADIATOR VALVE BODIES

220

tech. broch. 01034

Angled radiator valve body. Order thermo-electric actuators or thermostatic control heads separately for field installation.
Chrome plated.
Max. working pressure: 150 psi (10 bar).
Temperature range: 40—212°F (5—100°C).

Code	Description	Cv	Lbs	USD
220400A	½" NPT	2.7	0.3	**74.60**
220500A	¾" NPT	3.7	0.3	**81.90**

221

tech. broch. 01034

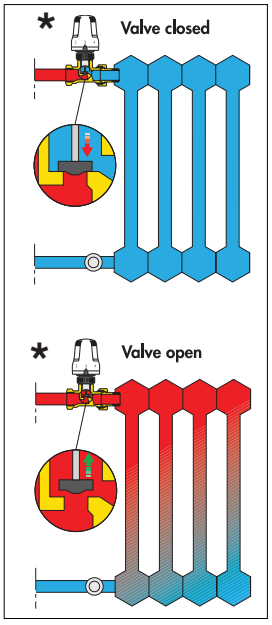
Straight radiator valve body.
Order thermo-electric actuators or thermostatic control heads separately for field installation.
Chrome plated.
Max. working pressure: 150 psi (10 bar).
Temperature range: 40—212°F (5—100°C).

Code	Description	Cv	Lbs	USD
221400A	½" NPT	1.7	0.3	**74.60**
221500A	¾" NPT	2.5	0.3	**81.90**

Function

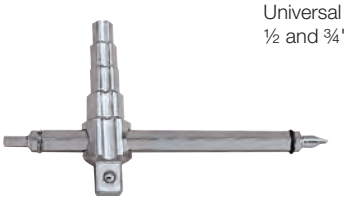
The control mechanism of the thermostatic radiator valve is a proportional temperature controller, composed of a liquid filled bellows. With increasing temperature the liquid expands which, in turn, causes the bellows to expand. When the temperature decreases the opposite occurs; the bellows contracts allowing the spring to return it to the original position. By connection to the valve stem, these movements adjust the heat transfer medium to the radiator.

*Head shown vertical for illustration only, it should be installed horizontally.



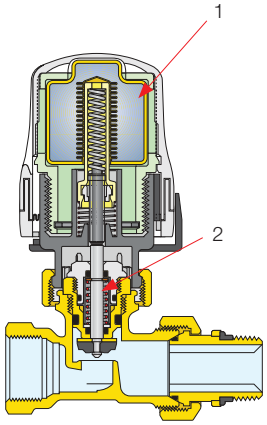
Replacement internal valve assembly fits radiator valves.

Code	Description	Lbs	USD
F36073	½" and ¾"	0.1	**10.50**



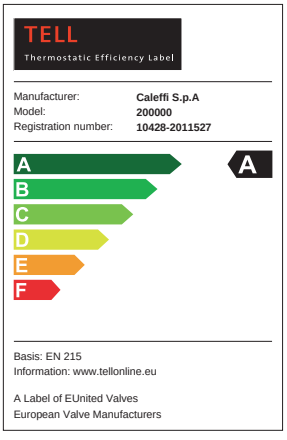
Universal radiator tool for installing ½ and ¾" tail pieces.

Code	Description	Lbs	USD
387127	Radiator tool	1.0	**110.00**



Key features

The thermostatic control head is filled with a non compressible liquid bellows (1). Plus, the radiator valve body has extra strong valve stem compression spring (2). The non compressible liquid provides the force required to compress the strong valve stem spring. When the temperature decreases, the liquid bellows contracts, which allows the valve stem spring to lift the valve plug from valve seat after long periods of non movement. This ensures that after a long 'off-season', when the actuator operates for the first time, the spring reliably lifts the valve plug off the seat without sticking. In addition, the 200000 control head features an easy-to-use locking mechanism that prevents unauthorized temperature set point changes and a range stop adjustment that limits the maximum temperature setting to save energy and over-heating.



The Caleffi thermostatic control heads 200000 and 201000, and the radiator valve bodies 220 and 221 series in combination with control heads are approved to EN 215 (KEYMARK) and Thermostatic Efficiency Label (TELL): Level A, Reg. 10428/9-20110527. Under EN 215 these devices are certified to meet manufacturer quality assurance requirements with reference to temperature setting and adjustment, nominal flow rate, hysteresis, and leak tightness of the body assembly and stem seal. The European TELL certification promotes responsible energy usage and provides information to customers when selecting products. The control heads 200000 and 201000 are "A" rated for efficiency. Additional information available on request.

EUROPEAN TOWEL WARMER RADIATOR VALVES

338

tech. broch. 01009

Angled radiator valve body.
Convertible from standard manual operation to automatic control with thermostatic control heads.
Chrome plated.
Fits copper, single and multilayer PEX pipes.
Max. working pressure: 150 psi (10 bar).
Temperature range: 40—212ºF (5—100ºC).

Code	Radiator Connection	Pipe Connection	Cv	Lbs	USD
338452	½" straight	¾" conical	3.1	0.5	**78.50**

342

tech. broch. 01009

Angled isolation and balancing valve.
Chrome plated.
Fits copper, single and multilayer PEX pipes.
Max. working pressure: 150 psi (10 bar).
Temperature range: 40—212ºF (5—100ºC).

Code	Radiator Connection	Pipe Connection	Cv	Lbs	USD
342452	½" straight	¾" conical	4.6	0.5	**51.70**

339

tech. broch. 01009

Straight radiator valve body.
Convertible from standard manual operation to automatic control with thermostatic control heads.
Chrome plated.
Fits copper, single and multilayer PEX pipes.
Max. working pressure: 150 psi (10 bar).
Temperature range: 40—212ºF (5—100ºC).

Code	Radiator Connection	Pipe Connection	Cv	Lbs	USD
339452	½" straight	¾" conical	2.0	0.5	**84.60**

343

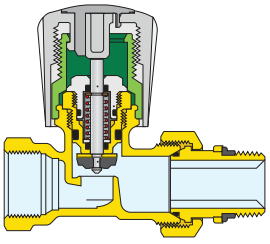
tech. broch. 01009

Straight isolation and balancing valve.
Chrome plated.
Fits copper, single and multilayer PEX pipes.
Max. working pressure: 150 psi (10 bar).
Temperature range: 40—212ºF (5—100ºC).

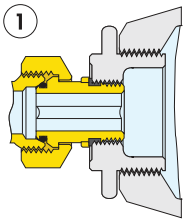
Code	Radiator Connection	Pipe Connection	Cv	Lbs	USD
343452	½" straight	¾" conical	2.5	0.5	**54.20**

Intended for use in metric radiators such as European towel warmers and panel radiators.

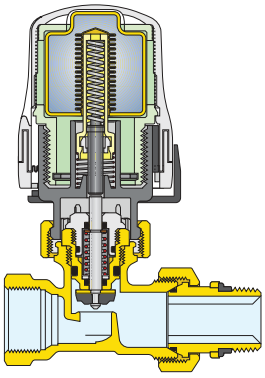
Metric radiator valve body with standard manual control

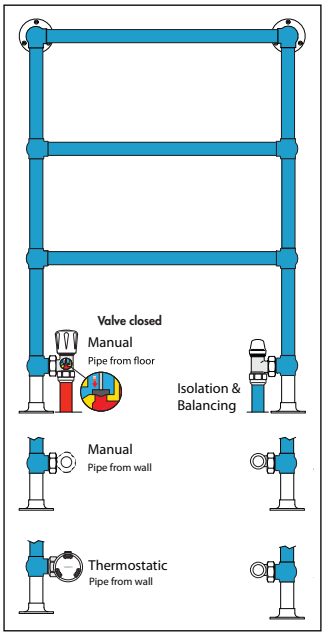


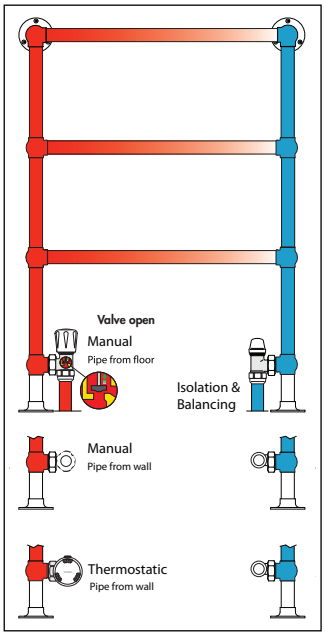
The radiator connection thread (½" straight) coupling union has a special shaped rubber ring (1), which ensures a tight seal requiring no PTFE tape.



Metric radiator valve body with thermostatic control head

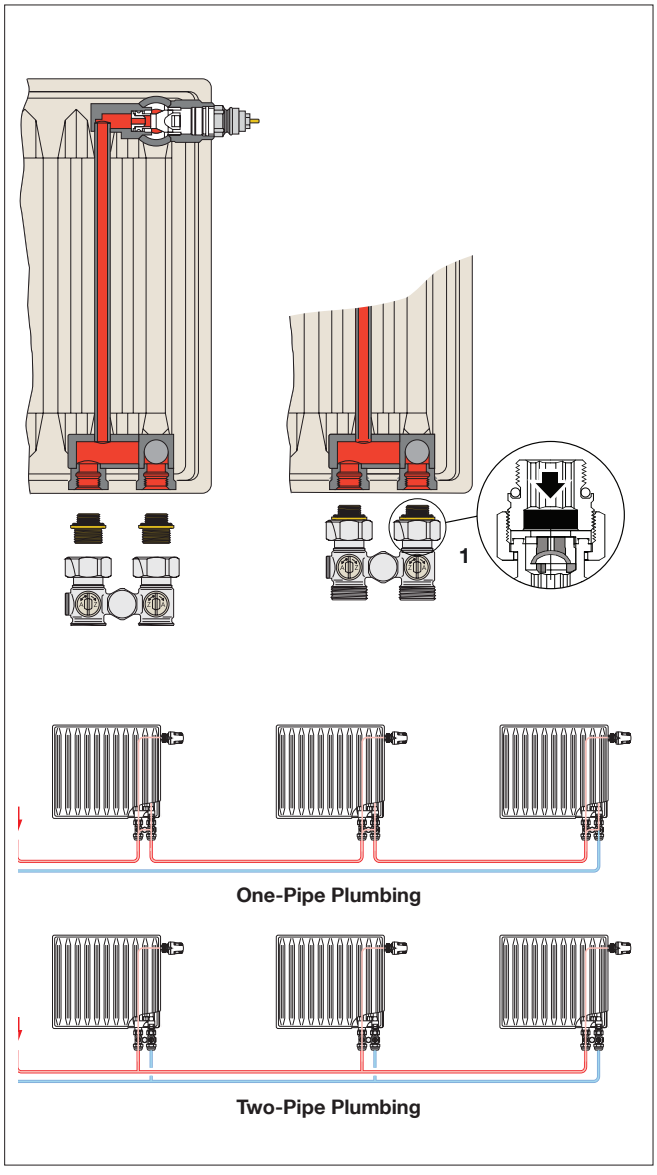






CONNECTION VALVES FOR PANEL RADIATORS

Caleffi panel radiator valves are designed to be installed to the bottom of panel radiators. They come in two versions: for two-pipe and one-pipe systems. Both are available straight (pipes exiting the floor) and angled (pipes exiting the wall). The two-pipe version is equipped with two ball shut-off valves; the one-pipe, in addition to the shut-off valves, is equipped with an adjustable by-pass from 30% to 50% of the flow rate towards the radiator, and a flow check valve device (1) prevents thermo-syphoning upward into radiator from by-passing flow.



3010

tech. broch. 01036

Valve for panel radiators that have built-in thermostatic valve unit.
Two-pipe straight version (floor connections) fits ½" female radiator connections.
Max. working pressure: 150 psi (10 bar).
Max. working temperature: 212°F (100°C).

Code	Radiator Connection	Pipe Connection	Lbs	USD
301040	½" straight	¾" conical	1	**63.00**

3011

tech. broch. 01036

Valve for panel radiators that have built-in thermostatic valve unit.
Two-pipe valve angled version (wall connections) fits ½" female radiator connections.
Max. working pressure: 150 psi (10 bar).
Max. working temperature: 212°F (100°C).

Code	Radiator Connection	Pipe Connection	Lbs	USD
301140	½" straight	¾" conical	1	**63.00**

3012

tech. broch. 01036

Valve for panel radiators that have built-in thermostatic valve unit.
One-pipe straight version (floor connections) fits ½" female radiator connections.
With adjustable by-pass.
Balance knob.
Max. working pressure: 150 psi (10 bar).
Max. working temperature: 212°F (100°C).

Code	Radiator Connection	Pipe Connection	Lbs	USD
301241	½" straight	¾" conical	1	**110.30**

3013

tech. broch. 01036

Valve for panel radiators that have built-in thermostatic valve unit.
One-pipe angled version (wall connections) fits ½" female radiator connections.
With adjustable by-pass.
Balance knob.
Max. working pressure: 150 psi (10 bar).
Max. working temperature: 212°F (100°C).

Code	Radiator Connection	Pipe Connection	Lbs	USD
301341	½" straight	¾" conical	1	**110.30**

4497

tech. broch. 01036

Wall-covering plate.
Fits dual panel radiator valves 301.
With wall connections.
In white ABS.
Outlet center distance: 40—50 mm.

Code	Description	Lbs	USD
449740	Plate	0.1	**5.50**

CONNECTION FITTINGS

681 Universal PEX fittings

681 series fittings are compatible with any ASTM F876 single layer PEX.
Max. working pressure: 150 psi.
Working temperature for ASTM F876 PEX piping: 41—180°F.
Chrome plated nut.

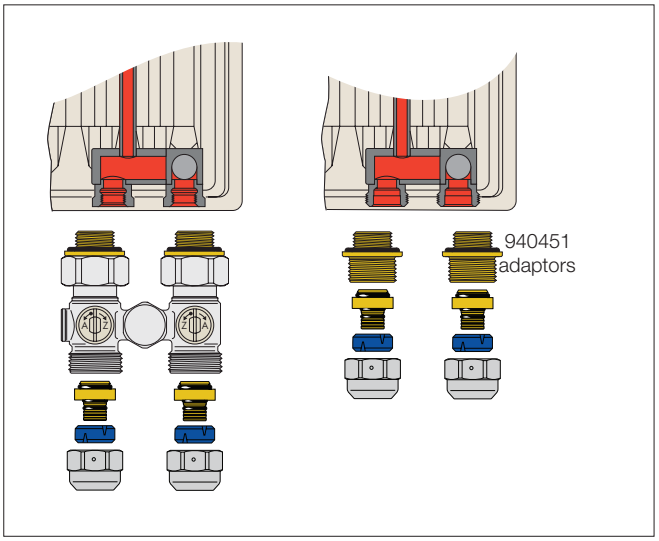
Code	Description	Lbs	USD
681503A	⅜" nominal PEX	0.2	**13.00**
681524	½" nominal PEX	0.2	**13.00**
681555	⅝" nominal PEX	0.2	**13.00**

682 Universal PEX-AL-PEX fittings

tech. broch. 01170

682 series fittings are compatible with any ASTM F1281 multilayer PEX-AL-PEX pipe.
Max. working pressure: 150 psi.
Working temperature for ASTM F1281 PEX-AL-PEX piping: 41—200°F with tubing rated 200°F.

Code	Description	Lbs	USD
682540A	½" PEX-AL-PEX	0.2	**12.80**



437

Compression fitting, fits ½" hard copper.
With o-ring seal.
Max. working pressure: 150 psi.
Working temperature range: 41—250°F.
Chrome plated.
For connecting copper to valve 301., 338, 339, 342 and 343 series.

Code	Description	Lbs	USD
437516	½" compression	0.1	**10.70**

940

tech. broch. 01036

Radiator adapter for directly connecting a panel radiator with PEX, PEX-AL-PEX, sweat, NPT or compression fittings.
Package of 2 each, priced per package.

Code	Description	Lbs	USD
940451	½" M straight x ¾" M conical (2 ea.)	0.1	**23.60**

NA102

Sweat connection fitting fits ½" copper.
Max. working pressure: 150 psi.
Working temperature range: 41—250°F.
Chrome plated nut.
For connecting copper to valve 301., 338, 339, 342 and 343 series.

Code	Description	Lbs	USD
NA10262	½" sweat	0.2	**13.90**

NA103

NPT connection fitting.
Max. working pressure: 150 psi.
Working temperature range: 41—250°F.
Chrome plated nut.
For connecting copper to valve 301., 338, 339, 342 and 343 series.

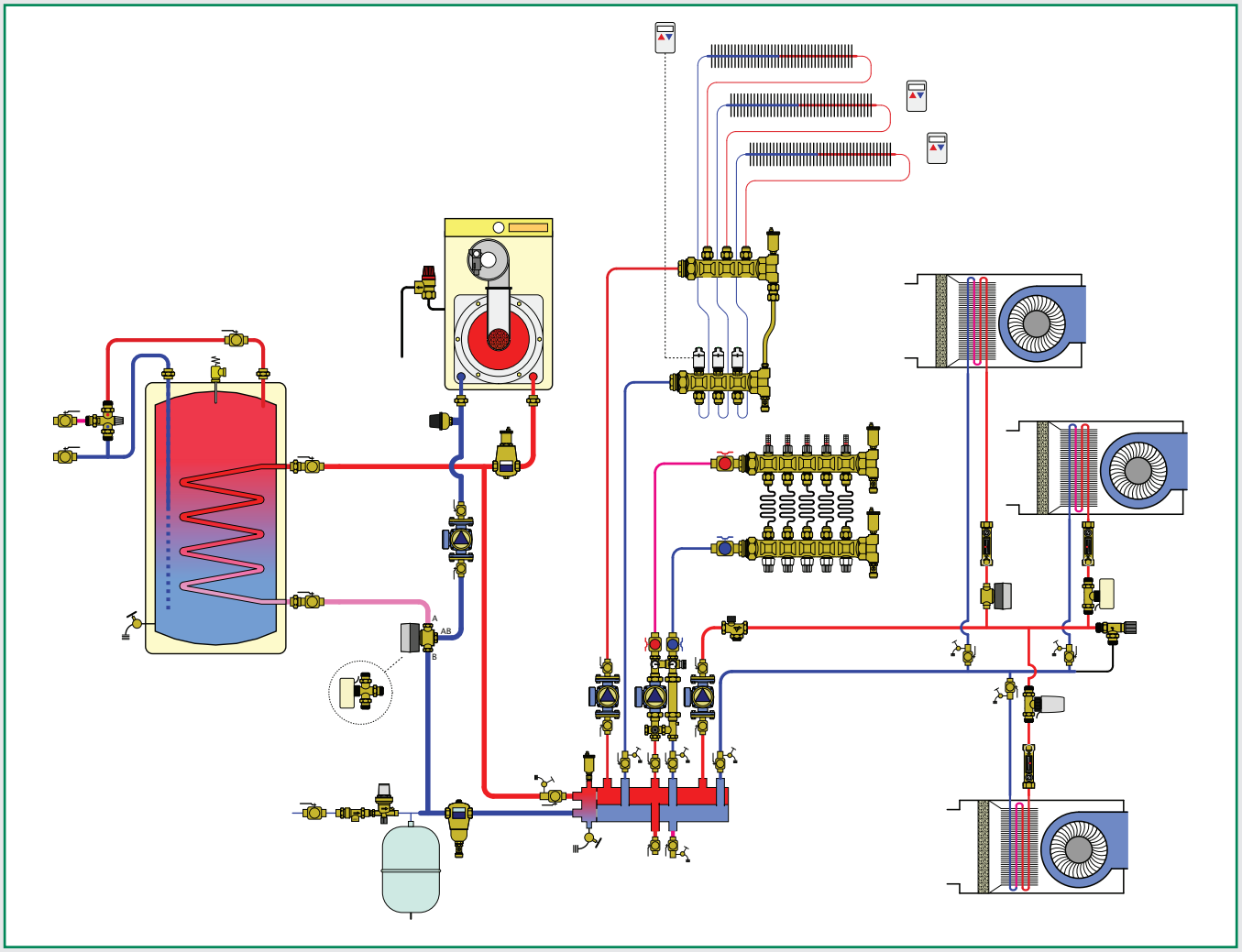
Code	Description	Lbs	USD
NA10313	½" NPT male	0.2	**15.00**

Wrench for tightening PEX fitting to TRV.

Code	Description	Lbs	USD
387100	26 mm x 30 mm	1.5	**59.40**

ZONE VALVES AND RELAYS

This diagram is an example



Thermo-electric zone valves

Thermo-electric actuators, including TwisTop™

Motorized zone valves, Z-one™

Pump zone controls, Z-one™ Relay

Valve zone controls, Z-one™ Relay

Motorized ball zone valves, high-flow, high-close off

THERMO-ELECTRIC ZONE VALVES

6763

tech. broch. 01072

Two-way thermo-electric zone valve.
Complete with 656414 actuator.
Spring return. Normally closed.
Brass valve body and trim.
Max. body pressure: 150 psi.
Max. Temperature: 200°F.
Max: ΔP close-off pressure: 20 psi.
Power supply: 24 V AC/DC.
Initial current draw: ≤ 250 mA.
Power consumption:
holding: 3 W
inrush: 6 VA
Rating of micro-switch contacts: 5 A (24 V).
31.5" wire lead connection.

Code	Description	Cv	Lbs	USD
676346A	½" press	4.0	1.4	**211.80**
676349A	½" sweat union	4.0	1.4	**187.40**
676356A	¾" press	4.0	1.4	**213.70**
676359A	¾" sweat union	4.0	1.4	**201.50**
676366A	1" press	4.0	1.4	**266.30**
676369A	1" sweat union	4.0	1.4	**215.50**

6762

tech. broch. 01072

Two-way thermo-electric zone valve.
Complete with TwisTop™ (code 656314) actuator. Spring return. Normally closed.
Brass valve body and trim.
Max. body pressure: 150 psi.
Max. Temperature: 200°F.
Max: ΔP close-off pressure: 20 psi.
Power supply: 24 V AC/DC.
Initial current draw: 800 mA.
Power consumption:
holding: 3 W
inrush: 19 VA
Rating of micro-switch contacts: 5 A (24 V).
31.5" wire lead connection.

Code	Description	Cv	Lbs	USD
676246A	½" press	4.0	1.4	**247.70**
676249A	½" sweat union	4.0	1.4	**221.60**
676256A	¾" press	4.0	1.4	**247.90**
676259A	¾" sweat union	4.0	1.4	**235.70**
676266A	1" press	4.0	1.4	**302.20**
676269A	1" sweat union	4.0	1.4	**249.70**

6564

tech. broch. 01198

Thermo-electric actuator with micro-switch fits on 676 two-way zone valve bodies.
Low current draw.
Protection class (installed in all positions): NEMA 3 (IP54)
Power supply: 24 V AC/DC.
Initial current draw: ≤250 mA.
Power consumption:
holding: 3 W
inrush: 6 VA
Rating of micro-switch contacts: 5 A (24 V).
31.5" wire lead connection.

Code	Description	Lbs	USD
656414	24 V AC/DC with micro-switch	0.4	**129.20**

6563 TwisTop™

tech. broch. 01072

TwisTop™ thermo-electric actuator with micro-switch fits on 676 two-way valve.
Twist the top to manually open and close micro-switch.
Power supply: 24 V AC/DC.
Initial current draw: 800 mA.
Power consumption:
holding: 3 W
inrush: 19 VA
Rating of micro-switch contacts: 5 A (24 V).
31.5" wire lead connection.
US Patent 7,617,989 B2.

Code	Description	Lbs	USD
656314	24 V AC/DC with micro-switch	0.4	**163.40**

6760

tech. broch. 01072

Two-way zone valve body.
For field installation of thermo-electric actuators 656314 or 656414.
Brass body and trim.
Max. body pressure: 150 psi.
Max. temperature: 200°F.

Code	Description	Cv	Lbs	USD
676046A	½" press	4.0	1.0	**76.20**
676049A	½" sweat union	4.0	1.0	**58.20**
676056A	¾" press	4.0	1.0	**84.50**
676059A	¾" sweat union	4.0	1.0	**72.30**
676066A	1" press	4.0	1.0	**130.60**
676069A	1" sweat union	4.0	1.0	**86.30**

NA605

Wall transformer.
Input voltage: 120 V AC
Output voltage: 24 V AC.
Power output: 40 VA.
Agency approval: cULus

Code	Description	Lbs	USD
NA605010	24 VAC wall transformer	1.0	**46.60**

MOTORIZED ZONE VALVES

Z4 Z-one 2-way

tech. broch. 01115

Two-way zone valve. Spring return.
Normally closed actuator: Z111000.
Auxiliary micro-switch.
Max. body pressure: 300 psi.
Temperature range: 32°—240°F.
Suitable fluids: water, 50% max. glycol, 15 psi max steam.
Power supply: 24 V AC.
Power consumption: 5 W, 7 VA.
Rating of auxiliary micro-switch contacts: 0.0 A min, 0.4 A max 24 V (24 V only).
18" wire lead connection.
UL873, cULus Listed & CE.
UL 1995 sec. 18 air plenums and ducts.
US Patent 7,048,251.

c UL E239721 US LISTED 86BP

Code	Description	Cv	Δ P	Lbs	USD
Z40	Inverted flare	3.5	30 psi	2.2	**220.30**
Z40F*	¾" Inv. flare	3.5	30 psi	2.2	**236.30**
Z42	½" SAE flare	3.5	30 psi	2.2	**227.60**
Z44	½" sweat	2.5	50 psl	2.1	**204.00**
Z45	¾" sweat	7.5	20 psi	2.2	**222.50**
Z46	1" sweat	7.5	20 psi	2.3	**275.60**
Z47	1¼" sweat	7.5	20 psi	2.3	**320.50**

* Two ¾" sweat fittings (NA10006) included.

Z5 Z-one 2-way

tech. broch. 01115

Two-way zone valve. Spring return.
Normally closed actuator: Z151000
Auxiliary micro-switch.
Max. body pressure: 300 psi.
Temperature range: 32°—240°F.
Suitable fluids: water, 50% max. glycol, 15 psi max steam.
Power supply: 24 V AC.
Power consumption: 5 W, 7 VA.
Rating of auxiliary micro-switch contacts: 0.0 A min, 0.4 A max 24 V (24 V only).
Screw terminal connection.
UL873, cULus Listed & CE.
UL 1995 sec. 18 air plenums and ducts.
US Patent 7,048,251.

c UL E239721 US LISTED 86BP

Code	Description	Cv	Δ P	Lbs	USD
Z50	Inverted flare	3.5	30 psi	2.2	**225.80**
Z50F*	¾" Inv. flare	3.5	30 psi	2.2	**241.80**
Z54	½" sweat	2.5	50 psi	2.1	**209.50**
Z55	¾" sweat	7.5	20 psi	2.2	**228.00**
Z56	1" sweat	7.5	20 psi	2.3	**281.10**
Z57	1¼" sweat	7.5	20 psi	2.3	**326.00**

* Two ¾" sweat fittings (NA10006) included.

NEW

Z-one 2-way

tech. broch. 01115

Two-way zone valve. Spring return.
Normally closed actuator.
Auxiliary micro-switch.
Max. body pressure: 300 psi.
Overall length: 5-⅝"
Temperature range: 32—240°F.
Suitable fluids: water, 50% max. glycol, 15 psi max steam.
Power supply: 24 V AC.
Power consumption: 5 W, 7 VA.
Rating of auxiliary micro-switch contacts: 0.0 A min, 0.4 A max 24 V (24 V only).
UL873, cULus Listed & CE.
UL 1995 sec. 18 air plenums and ducts.
US Patent 7,048,251.

c UL E239721 US LISTED 86BP

Code	Description	Cv	Δ P	Lbs	USD
Z44P	½" press*	2.5	50 psi	2.2	**281.00**
Z54P	½" press**	2.5	50 psi	2.2	**286.50**
Z45P	¾" press*	7.5	20 psi	2.2	**285.50**
Z55P	¾" press**	7.5	20 psi	2.2	**291.00**
Z45PL	¾" press* NEW	7.5	20 psi	2.3	**314.20**
Z55PL	¾" press** NEW	7.5	20 psi	2.3	**319.80**
Z46P	1" press*	7.5	20 psi	2.4	**323.00**
Z56P	1" press**	7.5	20 psi	2.4	**328.50**

*18" wire lead connection.
**Screw terminal connection.
PL (1) extra long press fitting for retrofit
Includes press fittings.

Inverted flare sweat adaptors fits Z40, Z50 and inverted flare valve body.

Code	Description	Lbs	USD
NA10005	½" sweat	0.3	**10.80**
NA10006	¾" sweat	0.3	**13.50**
NA10007	1" sweat	0.4	**22.20**
NA61241	Retrofit extension kit	0.2	**10.90**

Two Presscon™ copper press tail pieces with 1" brass union nuts and washers for use with 2-way 1" male union valve body (Z200687).

Code	Description	Lbs	USD
NA12246	½" press with 1" union nut NEW	0.2	**48.00**
NA12256	¾" press with 1" union nut	0.2	**52.50**
NA12266	1" press with 1" union slip nut NEW	0.4	**70.00**

Three Presscon™ copper press tail pieces with 1" brass union nuts and washers for use with 3-way 1" male union valve body (Z300687).

Code	Description	Lbs	USD
NA12346	½" press with 1" union nut NEW	0.3	**72.00**
NA12356	¾" press with 1" union nut	0.3	**78.75**
NA12366	1" press with 1" union slip nut NEW	0.6	**105.00**

NEW

Presscon™ long copper press tail piece with 1" brass union slip nut. Low lead. Requires sealing washer, not included.

Code	Description	Lbs	USD
NA16265L	¾" long press with 1" union slip nut	0.3	**55.00**

MOTORIZED ZONE VALVES

Z1 Normally Closed

tech. broch. 01115

E239721 US LISTED 86BP

Z1 NC actuator fits on Z2 and Z3 series valve bodies with the push of a button.
Two position spring return normally closed.
7/8" knockout for 1/2" conduit connector.
Power: 24, 120, 208, 230 & 277 VAC.
Power consumption: 5 W, 7 VA.
Conduct connector size: ½".
Rating of auxiliary switch contacts:
24 VAC: 0.0 A min, 0.4 A max (24 V).
120-277 VAC: 0.25 A min, 5.0 A max (250 V).
UL873, cULus Listed & CE.
UL 1995 sec.18 air plenums and ducts.
US Patent 7,048,251.

Code	Description	Lbs	USD
Z111000	24V with micro-switch 18" wire	1.1	**145.60**
Z116000	120V with micro-switch 6" wire	1.1	**145.60**
Z113000	208V with micro-switch 6" wire	1.1	**174.30**
Z114000	230V with micro-switch 6" wire	1.1	**174.30**
Z115000	277V with micro-switch 6" wire	1.1	**174.30**
Z151000	24V w/micro-switch terminal block	1.1	**151.10**
Z161000	24V without micro-switch terminal block	1.1	**139.00**
Z121000	24V without micro-switch 18" wire	1.1	**134.90**
Z126000	120V without micro-switch 6" wire	1.1	**134.90**
Z123000	208V without micro-switch 6" wire	1.1	**163.70**
Z124000	230V without micro-switch 6" wire	1.1	**163.70**
Z125000	277V without micro-switch 6" wire	1.1	**163.70**

Z1 Normally Open

tech. broch. 01115

E239721 US LISTED 86BP

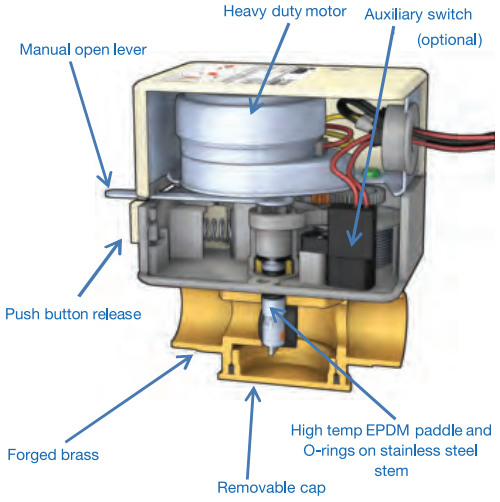
Z1 NO actuator fits on Z2 series valve bodies with the push of a button.
Two position spring return normally opened.
7/8" knockout for 1/2" conduit connector.
Power: 24, 120, 208, 230 & 277 VAC.
Power consumption: 5 W, 7 VA.
Conduct connector size: ½".
Rating of auxiliary switch contacts:
24 VAC: 0.0 A min, 0.4 A max (24 V).
120-277 VAC: 0.25 A min, 5.0 A max (250 V).
UL873, cULus Listed & CE.
UL 1995 sec. 18 air plenums and ducts.
US Patent 7,048,251.

Code	Description	Lbs	USD
Z131000	24V with micro-switch 18" wire	1.1	**159.20**
Z136000	120V with micro-switch 6" wire	1.1	**159.20**
Z133000	208V with micro-switch 6" wire	1.1	**187.80**
Z134000	230V with micro-switch 6" wire	1.1	**187.80**
Z135000	277V with micro-switch 6" wire	1.1	**187.80**
Z141000	24V without micro-switch 18" wire	1.1	**148.50**
Z146000	120V without micro-switch 6" wire	1.1	**148.50**
Z143000	208V without micro-switch 6" wire	1.1	**177.10**
Z144000	230V without micro-switch 6" wire	1.1	**177.10**
Z145000	277V without micro-switch 6" wire	1.1	**177.10**

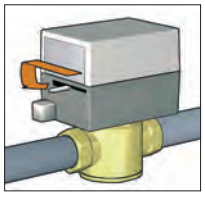
Function

The Z-one™ valve is a truly universal zone valve that can be used in a wide range of commercial and residential applications; from fan coils to baseboard, radiant to high rise, the Z-one™ is the professional's valve of choice. The Z-one™ can be used in both chilled or hot water and low pressure steam applications. With Delta P close off pressures of up to 75 PSI, the Z-one™ outperforms all other zone valves. The Z-one™ is available in sizes from ½" to 1¼" sweat or NPT connections on valve body, with removable actuator available in 24 to 277 voltages.

Some models of Z-one™ actuators contain an auxiliary micro-switch to operate other devices. The 24 V actuators use a sealed reed switch, which has been produced specifically for use with relays, boiler contacts (TT) and DDC systems. It requires no minimum current load. The 120 V - 277 V actuators for applications requiring greater than 400 mA, use a conventional micro-switch with silver contacts. The auxiliary switch is activated when the valve is 60% open or when the actuator is manually opened.



• Manual opening (Normally closed actuator only) The valve can be opened manually by moving the lever for opening it. When the power is restored the manual control is automatically overridden. The auxiliary switch in 24 V actuators is tripped when the unit is put into manual open position. This helps during start up to check if the wiring is correct without firing the valve electrically with the thermostat.



• Easy push button

A simple push of the button makes it easy to remove it from the body of the valve for maintenance or replacement operations. Warning: the actuator can only be used with valve bodies Z2-Z3 series.

• Operation

The actuator is fitted with a special mechanism for gradual movement of the valve paddle which provides smooth and quiet constant operation. Power-on full stroke run time is 60 seconds with 6 second power-off return time eliminating the effects of water hammer.

MOTORIZED ZONE VALVES

Z2 2-way

tech. broch. 01115

Two-way on/off two position valve.
Straight through flow pattern.
Brass body.
Stainless steel stem.
EPDM rubber seals and paddle.
Max. working pressure: 300 psi.
Max temperature: 240°F.

Z3 3-way

tech. broch. 01115

Three-way on/off two position valve.
Diverting flow pattern.
Brass body.
Stainless steel stem.
EPDM rubber seals and paddle.
Max. working pressure: 300 psi.
Max temperature: 240°F.

Code	Description		Cv	Δ P	Lbs	USD
Z200041	Inverted Flare		1.0	75 psi	1.1	**63.70**
Z200042	Inverted Flare		2.5	50 psi	1.1	**63.70**
Z200043	Inverted Flare		3.5	30 psi	1.1	**63.70**
Z200053	½" SAE Flare		3.5	30 psi	1.1	**82.00**
Z200411	½" NPT		1.0	75 psi	1.1	**63.70**
Z200412	½" NPT		2.5	50 psi	1.1	**63.70**
Z200413	½" NPT		3.5	30 psi	1.1	**63.70**
Z200431	½" sweat		1.0	75 psi	1.0	**58.40**
Z200432	½" sweat		2.5	50 psi	1.0	**58.40**
Z207433*	½" sweat	**LF**	3.5	30 psi	1.0	**82.00**
Z200512	¾" NPT		2.5	50 psi	1.2	**87.40**
Z200513	¾" NPT		3.5	30 psi	1.2	**87.40**
Z200515	¾" NPT		5.0	25 psi	1.2	**87.40**
Z200517	¾" NPT		7.5	20 psi	1.2	**87.40**
Z200532	¾" sweat		2.5	50 psi	1.1	**76.90**
Z200533	¾" sweat		3.5	30 psi	1.1	**76.90**
Z207533*	¾" sweat	**LF**	3.5	30 psi	1.1	**100.50**
Z200535	¾" sweat		5.0	25 psi	1.1	**76.90**
Z200537	¾" sweat		7.5	20 psi	1.1	**76.90**
Z207537*	¾" sweat	**LF**	7.5	20 ps	1.1	**100.50**
Z200617	1" NPT		7.5	20 psi	1.3	**137.90**
Z200635	1" sweat		5.0	25 psi	1.2	**130.00**
Z200637	1" sweat		7.5	20 psi	1.2	**130.00**
Z200737	1¼" sweat		7.5	20 psi	1.3	**174.90**
Z200687**	1" male union		7.5	20 psi	1.1	**87.40**

*__LF__ Low-lead brass body.
** Presscon fitting body.

Code	Description		Cv	Δ P	Lbs	USD
Z300041	Inverted Flare		1.0	75 psi	1.1	**84.90**
Z300042	Inverted Flare		2.5	50 psi	1.1	**84.90**
Z300043	Inverted Flare		3.5	30 psi	1.1	**84.90**
Z300053	½" SAE Flare		3.5	30 psl	1.1	**102.00**
Z300411	½" NPT		1.0	75 psi	1.1	**84.90**
Z300412	½" NPT		2.5	50 psi	1.1	**84.90**
Z300413	½" NPT		3.5	30 psi	1.1	**84.90**
Z300431	½" sweat		1.0	75 psi	1.0	**79.60**
Z300432	½" sweat		2.5	50 psi	1.0	**79.60**
Z307433*	½" sweat	**LF**	3.5	30 psi	1.0	**103.30**
Z300512	¾" NPT		2.5	50 psi	1.2	**106.10**
Z300513	¾" NPT		3.5	30 psi	1.2	**106.10**
Z300515	¾" NPT		5.0	25 psi	1.2	**106.10**
Z300517	¾" NPT		7.5	20 psi	1.2	**106.10**
Z300532	¾" sweat		2.5	50 psi	1.1	**98.40**
Z300533	¾" sweat		3.5	30 psi	1.1	**98.40**
Z300535	¾" sweat		5.0	25 psi	1.1	**98.40**
Z307537*	¾" sweat	**LF**	7.5	20 psi	1.0	**121.90**
Z300617	1" NPT		7.5	20 psi	1.3	**159.20**
Z300635	1" sweat		5.0	25 psi	1.2	**148.40**
Z300637	1" sweat		7.5	20 psi	1.2	**148.40**
Z300737	1¼" sweat		7.5	20 psi	1.3	**180.20**
Z300687**	1" male union		7.5	20 psi	1.2	**111.00**

*__LF__ Low-lead brass body.
** Presscon fitting body.

Two-way and three-way zone valve body repair kit. Includes valve stem paddle with O-rings, C clip and one bottom cap O-ring.

Code	Description	Lbs	USD
F69293	Repair kit for all 1/2" & 3/4" sweat Z2, Z3 valves	0.4	**21.90**
F69294	Repair kit for 3/4" NPT and all 1" Z2, Z3 valves	0.4	**21.90**

NA605

Wall transformer.
Input voltage: 120 V AC
Output voltage: 24 V AC.
Power output: 40 VA.
Agency approval: cULus

Code	Description	Lbs	USD
NA605010	24 VAC wall transformer	1.0	**46.60**

PUMP ZONE CONTROLS

Intertek 4009064
Certified to CSA C22-2 No.24
Conforms to UL Standard 873

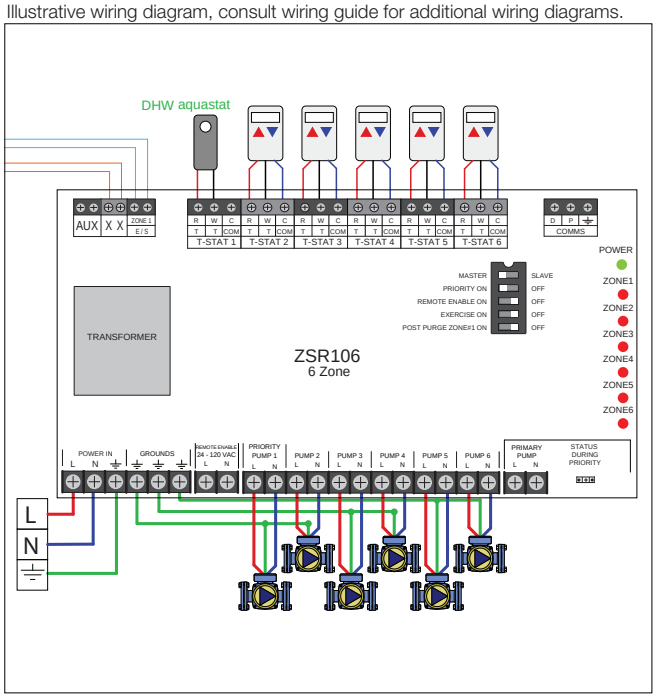
ZSR
Z-one Relay

tech. broch. 01284

The ZSR series is multi-zone pump and boiler operating control for multiple zone hydronic heating systems. The ZSR series interfaces with low voltage thermostats, or any other low voltage controllers having a switching action. The ZSR series controls up to 3, 4, 5 or 6 heating circulator pumps, depending on model selected, a primary pump and has LED indicators to provide functional status and easy system troubleshooting. In addition, a primary pump system circulator is switched on whenever any zone calls for heat.

Power supply: 120 VAC, 50/60 Hz
Transformer voltage: 24 VAC
Maximum transformer load: 12 VA (ZSR103/4), 20 VA (ZSR106)
Electrical switch rating: 20A max combined
Electrical switch rating pump output: 120 VAC, 5A each
Dry contact rating, AUX, XX, ZONE1 E/S: 120 VAC max, 2A each
Replaceable fuses: Type 2AG, 5A slow blow

Illustrative wiring diagram, consult wiring guide for additional wiring diagrams.



Code	Description	Lbs	USD
ZSR103	3 zone pump control	2.0	**375.00**
ZSR104	4 zone pump control	2.0	**440.00**
ZSR106	6 zone pump control	2.0	**540.00**

ZSR101
Z-one Relay

tech. broch. 01285

The ZSR101 single zone switching relay is operated by low voltage thermostats. The ZSR101 single zone switching relay incorporates Power In, Relay 1 and Relay 2 connection terminals.

Power Supply: 120 VAC, 50/60 Hz
Transformer Voltage: 24 VAC
Maximum transformer load: 12 VA
Switch Rating: 10A Max Combined
Replaceable Fuses: Type 2AG, 5A

Intertek 4009064
Certified to CSA C22-2 No.24
Conforms to UL Standard 873

Z-ONE RELAY FUSES

Code	Description	Lbs	USD
NA10342	Spare fuse (package of 5)	0.1	**15.00**

Code	Description	Lbs	USD
ZSR101	Single zone relay	1.0	**160.00**

VALVE ZONE CONTROLS

Certified to CSA C22-2 No.24
Conforms to UL Standard 873
Intertek
4009064

ZVR
Z-one™ Relay

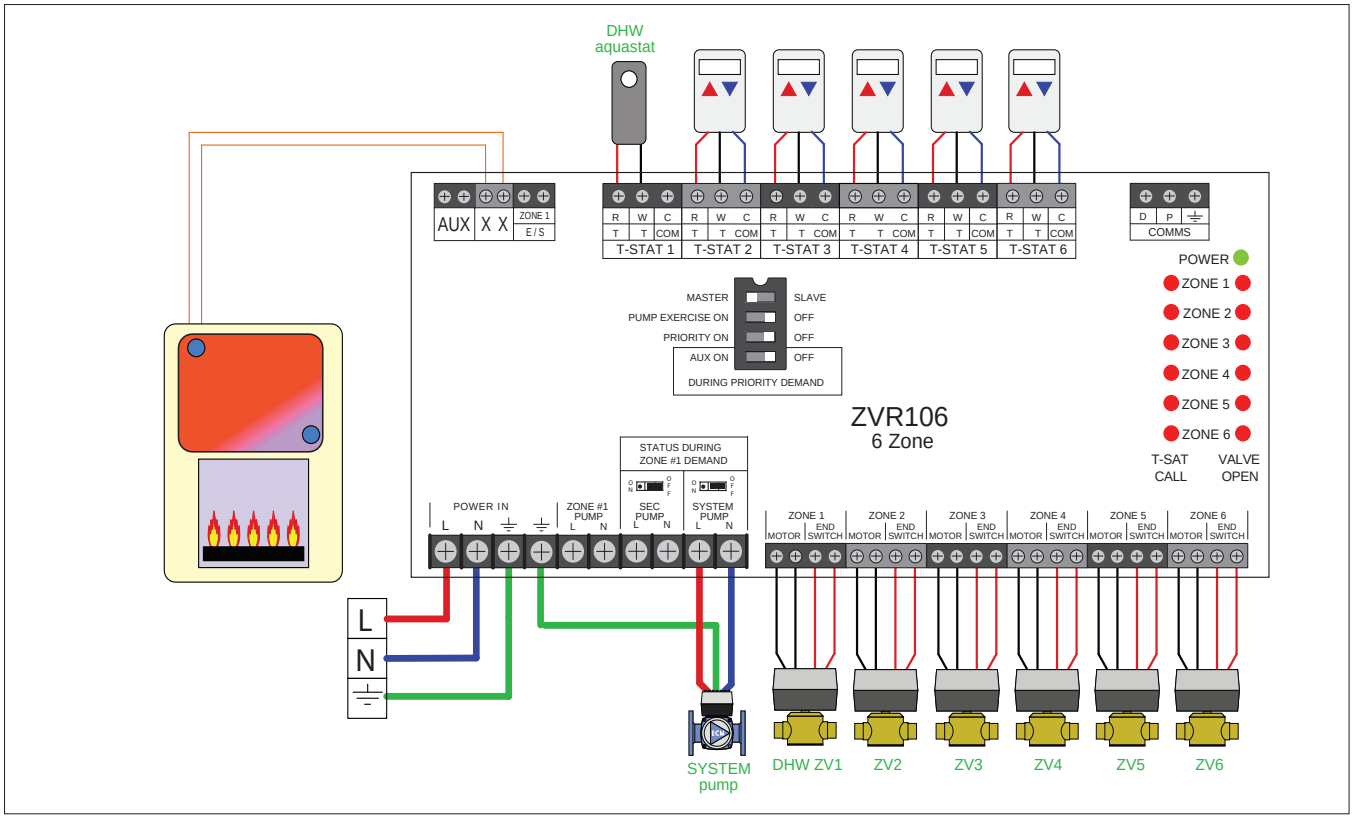
tech. broch. 01286

The ZVR series is a multi-zone valve relay and boiler operating control for multiple zone hydronic heating systems. The ZVR series interfaces with low voltage thermostats, or any other low voltage controllers having a switching action. The ZVR series controls up to 3, 4, 5 or 6 zones, depending on model selected. In addition, a system circulator pump and secondary pump is turned on whenever any zone calls for heat. LED indicators provide functional status and easy system troubleshooting. The ZVR series is a perfect match with Caleffi's Z-one™ motorized zone valves.

Power supply: 120 VAC, 50/60 Hz
Transformer voltage: 24 VAC
Maximum transformer load: 40 VA (ZVR103/4), 80 VA (ZVR106)
Electrical switch rating: 20A Max Combined
Electrical switch rating, AUX, XX, ZONE1 E/S:120 VAC, 2A each
Electrical switch rating pumps: 120 VAC, 5A each
Resettable Fuse: automatic
High Capacity 40 VA Transformer standard for 3 and 4 zone models-expandable to 80 VA, and 80 VA for the 6 zone model

Code	Description	Lbs	USD
ZVR103	3 zone valve control	2.0	**285.00**
ZVR104	4 zone valve control	2.0	**340.00**
ZVR106	6 zone valve control	2.0	**440.00**
NA10343	Expansion transformer	0.1	**90.00**

Illustrative wiring diagram, consult wiring guide for additional wiring diagrams.



MOTORIZED BALL ZONE VALVES HIGH-FLOW, HIGH CLOSE-OFF

6442 2-way Straight

tech. broch. 01131

Two-way motorized ball zone valve.
Straight.
Max. ΔP close-off pressure: 150 psi.
Temperature range: 20°—230°F.
Power supply: 24 VAC.
Power consumption: 4 VA.
Rating of micro-switch contacts: 5 A (24 V).
3-wire control.
36" wire lead connection.

Code	Description		Cv	Lbs	USD
644240A	½" NPT		13	2.3	**418.30**
644246A	½" press	●	13	2.4	**433.00**
644249A	½" sweat		13	2.3	**411.50**
644250A	¾" NPT		13	2.3	**432.10**
644256A	¾" press	●	13	2.4	**454.10**
644259A	¾" sweat		13	2.3	**425.10**
644260A	1" NPT		13	2.3	**459.50**
644266A	1" press	●	13	2.4	**499.50**
644269A	1" sweat		13	2.3	**452.70**

6443..3BY 3-way By-pass

tech. broch. 01131

Three-way motorized ball zone valve.
By-pass.
Max. ΔP close-off pressure: 150 psi.
Temperature range: 20°—230°F.
Power supply: 24 VAC.
Power consumption: 4 VA.
Rating of micro-switch contacts: 5 A (24 V).
3-wire control.
2.1 Cv in by-pass mode.
36" wire lead connection.

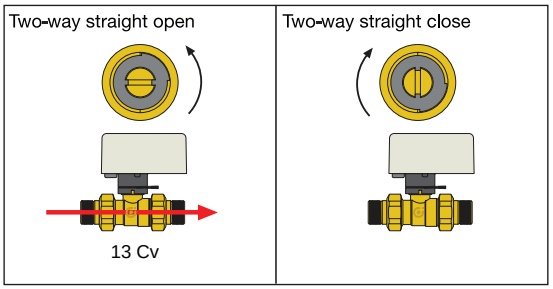
Code	Description		Cv	Lbs	USD
644340A 3BY	½" NPT		12	2.5	**452.70**
644346A 3BY	½" press	●	12	2.6	**475.20**
644349A 3BY	½" sweat		12	2.5	**445.70**
644350A 3BY	¾" NPT		12	2.5	**466.30**
644356A 3BY	¾" press	●	12	2.6	**499.30**
644359A 3BY	¾" sweat		12	2.5	**459.50**
644360A 3BY	1" NPT		12	2.5	**493.70**
644366A 3BY	1" press	●	12	2.6	**553.70**
644369A 3BY	1" sweat		12	2.5	**487.00**

6440 24 V 3-wire control

tech. broch. 01131

Actuator fits 6442 and 6443 series.
Power supply: 24 VAC.
Power consumption: 4 VA.
Rating of micro-switch contacts: 5 A (24 V).
Operating time: 40 s (90° rotation).
Length of supply cable: 36".

Code	Description	Lbs	USD
644004	24 VAC	1.0	**329.30**



6443 3-way Diverting

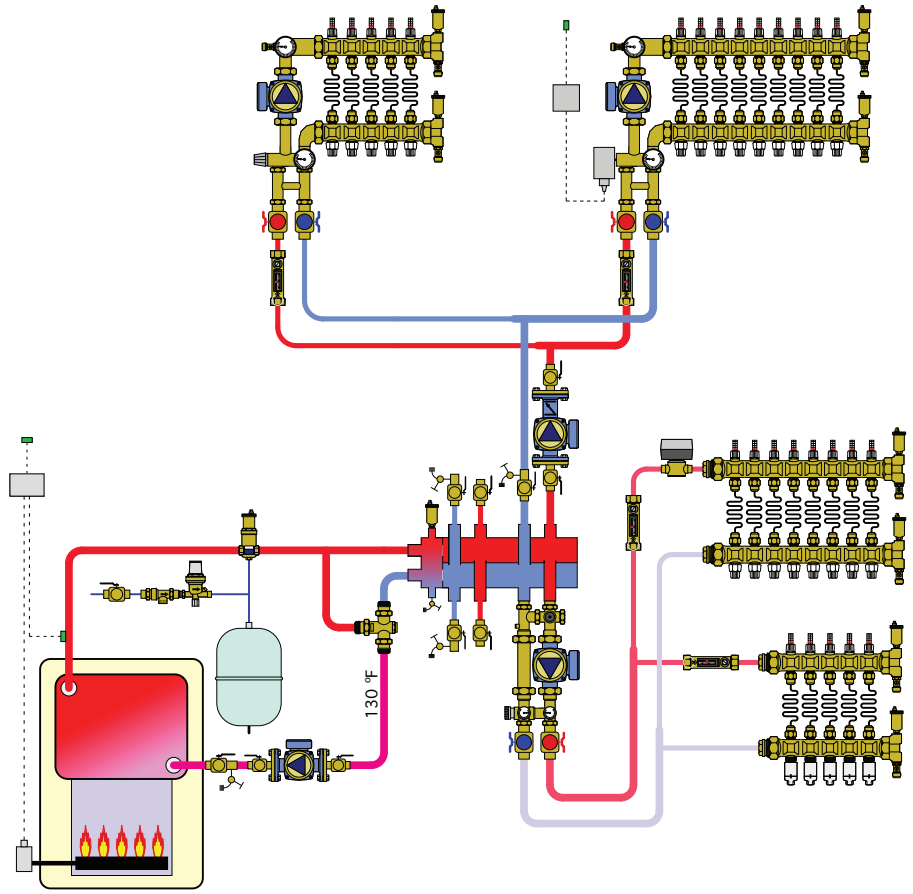
tech. broch. 01131

Three-way motorized ball zone valve.
Diverting.
Max. ΔP close-off pressure: 150 psi.
Temperature range: 20°—230°F.
Power supply: 24 VAC.
Power consumption: 4 VA.
Rating of micro-switch contacts: 5 A (24 V).
3-wire control.
36" wire lead connection.

Code	Description		Cv	Lbs	USD
644340A	½" NPT		4.5	2.5	**452.70**
644346A	½" press	●	4.5	2.6	**475.20**
644349A	½" sweat		4.5	2.5	**445.70**
644350A	¾" NPT		4.5	2.5	**466.30**
644356A	¾" press	●	4.5	2.6	**499.30**
644359A	¾" sweat		4.5	2.5	**459.50**
644360A	1" NPT		4.5	2.5	**493.70**
644366A	1" press	●	4.5	2.6	**553.70**
644369A	1" sweat		4.5	2.5	**487.00**

TEMPERATURE MIXING STATIONS AND DISTRIBUTION MANIFOLDS

This diagram is an example



Thermostatic fixed point mixing unit for HydroLink™, HydroMixer™

Motorized temperature mixing unit for HydroLink™, HydroMixer™

Motorized temperature mixing stations

Thermostatic mixing stations

Brass distribution manifolds, TwistFlow™

Distribution manifolds

Manifold mixing stations

Boxes for distribution manifolds

Fittings for distribution manifolds and mixing stations

Accessories

Fill and flush cart, HYDROFLUSH™

PUMP & VALVE TEMPERATURE MIXING UNITS

163 HydroMixer™

tech. broch. 01121

Thermostatic fixed temperature mixing unit with insulation. Includes Grundfos UPS 15-58 three speed pump.
Differential pressure by-pass valve adjustable from 1.5 to 8.5 psi.
Temperature gauges.
Shut-off ball valves.
1" NPT female union inlet fittings.
Max working pressure: 145 psi.
Adjustable range: 80—130°F.
Power supply: 115 V 50/60 Hz.

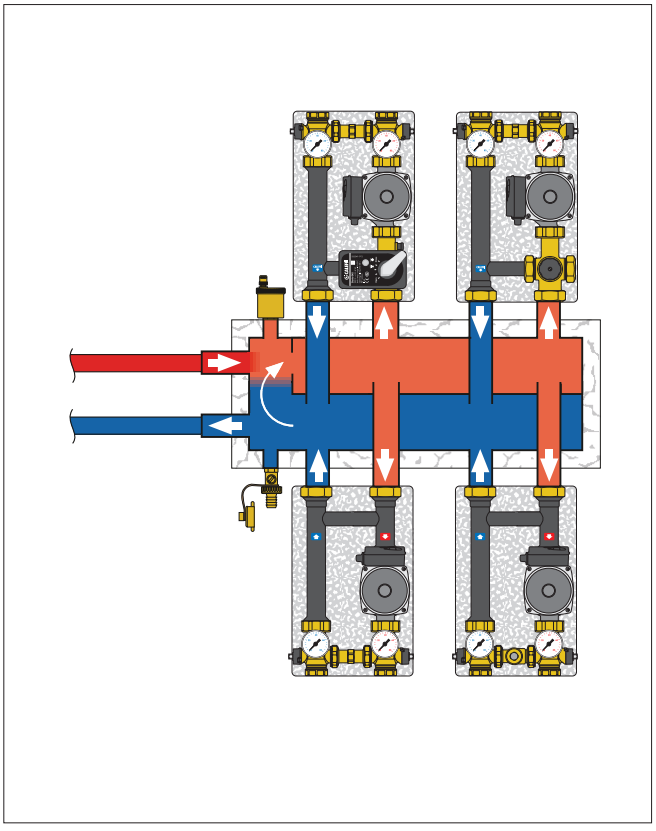
165 HydroMixer™

tech. broch. 01237

Injection pump mixing unit with insulation.
Grundfos UPS 15-58 three speed pump.
Grundfos Alpha 25-55U pump.
Temperature gauges.
Shut-off ball valves.
Compatible with 5599 Hydrolink™ series
Male union connections (select top and bottom fitting sets on page 35).
Max working pressure: 145 psi.
Max. working temperature: 212°F.
Power supply: 115 V 50/60 Hz.

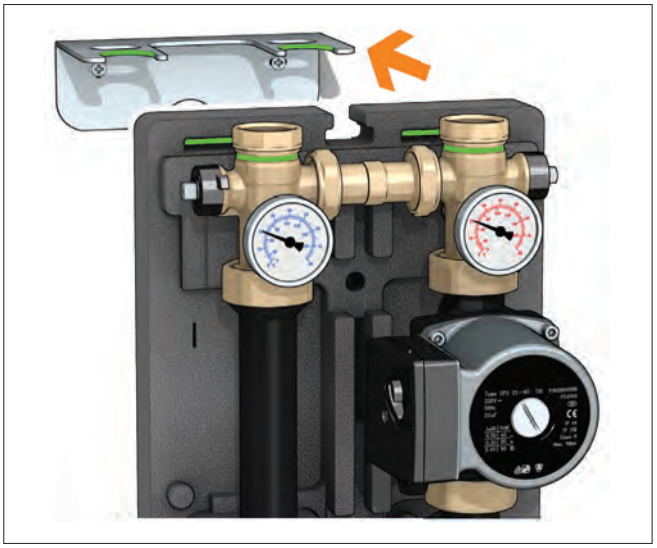
Code	Description	Lbs	USD
163600A	1" NPT outlet for right side flow	21	**1,890.00**
163610A	1" NPT outlet for left side flow	21	**1,890.00**

Code	Description	Lbs	USD
165600A	Dual line with 15-58 pump on right	21	**1,420.00**
165610A	Dual line with 15-58 pump on left	21	**1,420.00**
165602A	Dual line with Alpha pump on right	21	**1,735.00**
165612A	Dual line with Alpha pump on left	21	**1,735.00**



Wall bracket fits 165, 166 and 167 series.

Code	Description	Lbs	USD
165001	Wall bracket	0.1	**79.20**



PUMP & VALVE TEMPERATURE MIXING UNITS

166 HydroMixer™

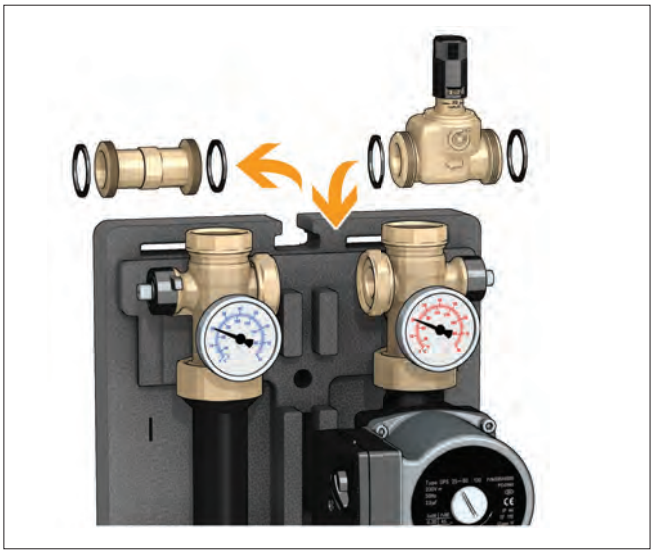
tech. broch. 01238

Thermostatic fixed temperature mixing unit with insulation.
Grundfos UPS 15-58 three speed pump.
Grundfos Alpha 25-55U pump.
Temperature gauges.
Shut-off ball valves.
Compatible with 5599 Hydrolink™ series
Male union connections (select top and bottom fitting sets below).
Max working pressure: 145 psi.
Adjustable range: 80—125°F.
Power supply: 115 V 50/60 Hz.

Code	Description	Lbs	USD
166600A	Dual line with 15-58 pump on right	22	**1,735.00**
166610A	Dual line with 15-58 pump on left	22	**1,735.00**
166602A	Dual line with Alpha pump on right	22	**2,050.00**
166612A	Dual line with Alpha pump on left	22	**2,050.00**

Optional differential pressure by-pass valve fits 165, 166 and 167 series.

Code	Description	Lbs	USD
519006	Differential pressure by-pass valve	1.0	**89.30**



167 HydroMixer™

tech. broch. 01239

Motorized temperature mixing unit with insulation. Three-point floating 24 VAC actuator for use with separately-sourced outdoor reset controller.
Grundfos UPS 15-58 three speed pump.
Grundfos Alpha 25-55U pump.
Temperature gauges.
Shut-off ball valves.
Compatible with 5599 Hydrolink™ series
Male union connections (select top and bottom fitting sets below).
Max working pressure: 145 psi.
Primary inlet temperature range: 40-212°F
Power supply: 115 V 50/60 Hz.
Valve actuator: 24 V AC

Code	Description	Lbs	USD
167600A	Dual line with 15-58 pump on right	23	**2,050.00**
167610A	Dual line with 15-58 pump on left	23	**2,050.00**
167602A	Dual line with Alpha pump on right	23	**2,365.00**
167612A	Dual line with Alpha pump on left	23	**2,365.00**

Top outlet fitting set fits 165, 166, 167 series. Includes (2) 1¼" union nuts, (2) tail pieces and (2) washers. Will not fit bottom inlet thread.

Code	Description	Lbs	USD
NA16069	1" sweat outlet union fittings	1.0	**81.50**

Bottom Inlet fitting set fit 165, 166, 167 series. Includes (2) 1½" union nuts, (2) tail pieces and (2) washers. Will not fit top outlet thread.

Code	Description	Lbs	USD
NA16169	1" sweat outlet union fittings	1.0	**82.50**

Top outlet fitting set fits 165, 166, 167 series. Includes (2) 1¼" union nuts, (2) tail pieces and (2) washers. Will not fit bottom inlet thread.

Code	Description	Lbs	USD
NA16060	1" NPT M outlet union fitting	1.0	**92.00**

Bottom Inlet fitting set fit 165, 166, 167 series. Includes (2) 1½" union nuts, (2) tail pieces and (2) washers. Will not fit top outlet thread.

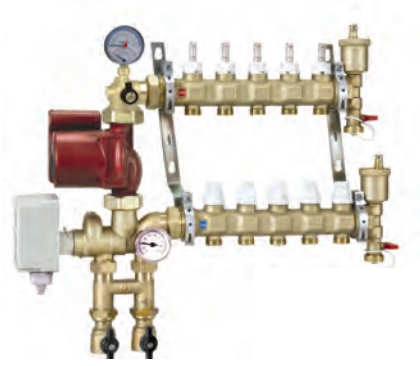
Code	Description	Lbs	USD
NA16160	1" NPT F inlet union fitting	1.0	**93.00**

MOTORIZED MANIFOLD MIXING STATIONS

171
Manifold mixing station three speed pump

tech. broch. 01154

Pre-assembled manifold motorized modulating three-point floating actuator mixing station consisting of a supply distribution manifold complete with built-in sight flow gauges, adjustable balancing valves. Return manifold with built-in shutoff valves is suitable for thermo-electric actuators, includes Grundfos UPS 15—58 three-speed pump. Use with separately-sourced outdoor reset controller.
¾" F NPT supply/return ball valves.
Max. working pressure: 150 psi.
Control temperature range: 70°—170°F
Primary inlet max. temperature: 40°—210°F
Outlet center distance: 2 in.

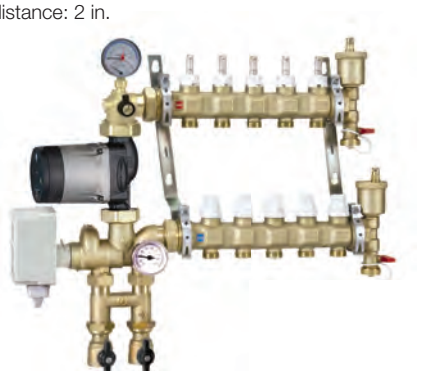


Code	Description	UPS Pump	No.	Outlets	Lbs	USD
1715C1A	¾"	15-58	3	¾" M	21	**2,011.00**
1715D1A	¾"	15-58	4	¾" M	23	**2,112.00**
1715E1A	¾"	15-58	5	¾" M	24	**2,214.00**
1715F1A	¾"	15-58	6	¾" M	26	**2,316.00**
1715G1A	¾"	15-58	7	¾" M	28	**2,417.00**
1715H1A	¾"	15-58	8	¾" M	29	**2,519.00**
1715I1A	¾"	15-58	9	¾" M	31	**2,621.00**
1715L1A	¾"	15-58	10	¾" M	32	**2,722.00**
1715M1A	¾"	15-58	11	¾" M	34	**2,824.00**
1715N1A	¾"	15-58	12	¾" M	36	**2,926.00**
1715O1A	¾"	15-58	13	¾" M	37	**3,027.00**

171
Manifold mixing station high efficiency pump

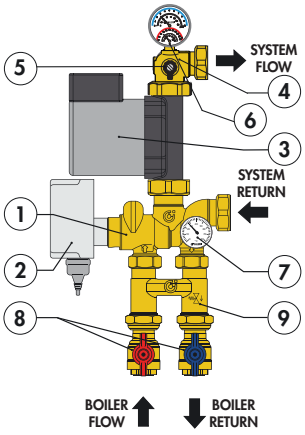
tech. broch. 01154

Pre-assembled motorized manifold mixing station complete with three-point floating type actuator for use with separately-sourced outdoor reset controller.
Consisting of a supply distribution manifold complete with built-in sight flow gauges, adjustable balancing valves. Return manifold with built-in shutoff valves is suitable for
thermo-electric actuators, includes Grundfos Alpha 25-55U high efficiency pump.
¾" F NPT supply/return ball valves.
Max. working pressure: 150 psi.
Control temperature range: 70°—170°F
Primary inlet max. temperature: 40°—210°F
Outlet center distance: 2 in.

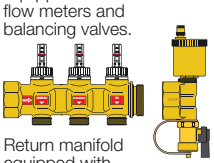


Code	Description	Alpha Pump	No.	Outlets	Lbs	USD
1715C1AHE	¾"	25-55U	3	¾" M	21	**2,326.00**
1715D1AHE	¾"	25-55U	4	¾" M	23	**2,427.00**
1715E1AHE	¾"	25-55U	5	¾" M	24	**2,529.00**
1715F1AHE	¾"	25-55U	6	¾" M	26	**2,631.00**
1715G1AHE	¾"	25-55U	7	¾" M	28	**2,732.00**
1715H1AHE	¾"	25-55U	8	¾" M	29	**2,834.00**
1715I1AHE	¾"	25-55U	9	¾" M	31	**2,936.00**
1715L1AHE	¾"	25-55U	10	¾" M	32	**3,037.00**
1715M1AHE	¾"	25-55U	11	¾" M	34	**3,139.00**
1715N1AHE	¾"	25-55U	12	¾" M	36	**3,241.00**
1715O1AHE	¾"	25-55U	13	¾" M	37	**3,342.00**

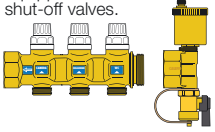
Item	Description	Symbol
1	Three-way mixing valve	
2	Three-point floating actuator	
3	Three-speed circulation pump UPS 15-58	
4	Top elbow with supply temperature and pressure gauge	
5	Purge valve	
6	Supply temperature and pressure gauge	
7	Return temperature gauge	
8	Primary circuit shut-off valves	
9	Primary circuit hydraulic separator with check valve	



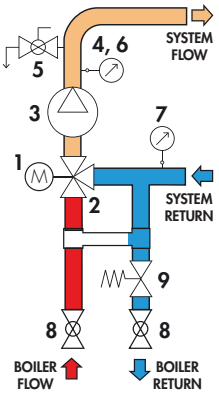
Supply manifold equipped with flow meters and balancing valves.



Return manifold equipped with shut-off valves.



End fittings with automatic air vent with hygroscopic cap and drain cock.



THERMOSTATIC MANIFOLD MIXING STATIONS

172
Manifold mixing station three speed pump

tech. broch. 01155

Pre-assembled thermostatic manifold mixing station consisting of a supply distribution manifold complete with built-in sight flow gauges, adjustable balancing valves. Return manifold with built-in shutoff valves is suitable for thermo-electric actuators. Complete with built-in sensor to keep flow temperature at constant set value.
Includes Grundfos UPS 15—58 three-speed pump.
¾" F NPT supply/return ball valves.
Max. working pressure: 150 psi.
Control temperature range: 80°—130°F
Primary inlet max. temperature: 195°F
Outlet center distance: 2 in.

Code	Description	UPS Pump	No.	Outlets	Lbs	USD
1725C1A	¾"	15-58	3	¾" M	20	**1,654.80**
1725D1A	¾"	15-58	4	¾" M	21	**1,761.90**
1725E1A	¾"	15-58	5	¾" M	23	**1,867.95**
1725F1A	¾"	15-58	6	¾" M	25	**1,975.05**
1725G1A	¾"	15-58	7	¾" M	27	**2,082.15**
1725H1A	¾"	15-58	8	¾" M	28	**2,188.20**
1725I1A	¾"	15-58	9	¾" M	29	**2,295.30**
1725L1A	¾"	15-58	10	¾" M	31	**2,402.40**
1725M1A	¾"	15-58	11	¾" M	33	**2,508.45**
1725N1A	¾"	15-58	12	¾" M	34	**2,615.55**
1725O1A	¾"	15-58	13	¾" M	36	**2,721.66**

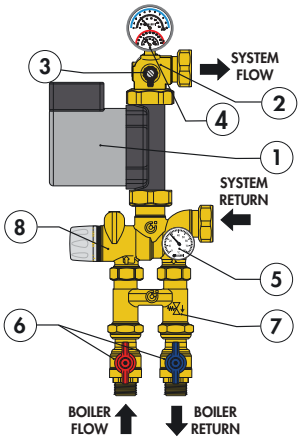
172
Manifold mixing station high efficiency pump

tech. broch. 01155

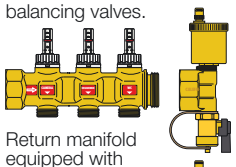
Pre-assembled thermostatic manifold mixing station consisting of a supply distribution manifold complete with built-in sight flow gauges, adjustable balancing valves. Return manifold with built-in shutoff valves is suitable for thermo-electric actuators. Complete with built-in sensor to keep flow temperature at constant set value.
Includes Grundfos Alpha 25-55U pump.
¾" F NPT supply/return ball valves.
Max. working pressure: 150 psi.
Control temperature range: 80°—130°F
Primary inlet max. temperature: 195°F
Outlet center distance: 2 in.

Code	Description	Alpha Pump	No.	Outlets	Lbs	USD
1725C1AHE	¾"	25-55U	3	¾" M	20	**1,985.55**
1725D1AHE	¾"	25-55U	4	¾" M	21	**2,092.65**
1725E1AHE	¾"	25-55U	5	¾" M	23	**2,198.70**
1725F1AHE	¾"	25-55U	6	¾" M	25	**2,305.80**
1725G1AHE	¾"	25-55U	7	¾" M	27	**2,412.90**
1725H1AHE	¾"	25-55U	8	¾" M	28	**2,518.95**
1725I1AHE	¾"	25-55U	9	¾" M	29	**2,626.05**
1725L1AHE	¾"	25-55U	10	¾" M	31	**2,733.15**
1725M1AHE	¾"	25-55U	11	¾" M	33	**2,839.20**
1725N1AHE	¾"	25-55U	12	¾" M	34	**2,946.30**
1725O1AHE	¾"	25-55U	13	¾" M	36	**3,052.35**

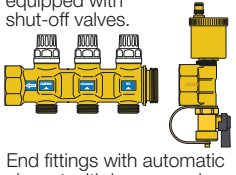
Item	Description	Symbol
1	Circulation pump UPS 15-58 pictured	
2	Top elbow with supply temperature and pressure gauge	
3	Purge valve	
4	Supply temperature and pressure gauge	
5	Return temperature gauge	
6	Primary circuit shut-off valves	
7	Primary circuit hydraulic separator with check valve	
8	Thermostatic three-way mixing valve with built-in sensor	



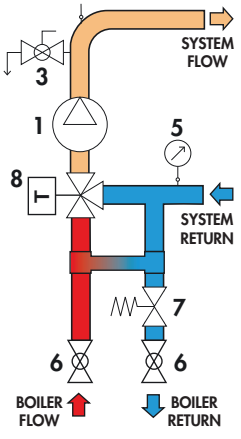
Supply manifold equipped with flow meters and balancing valves.



Return manifold equipped with shut-off valves.



End fittings with automatic air vent with hygroscopic cap and drain cock.

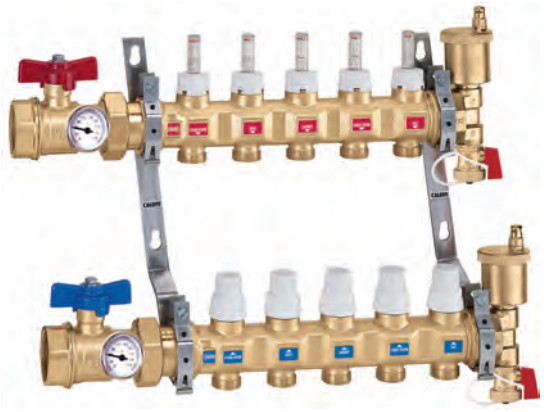


BRASS DISTRIBUTION MANIFOLDS

668S1
TwistFlow™ Assembly

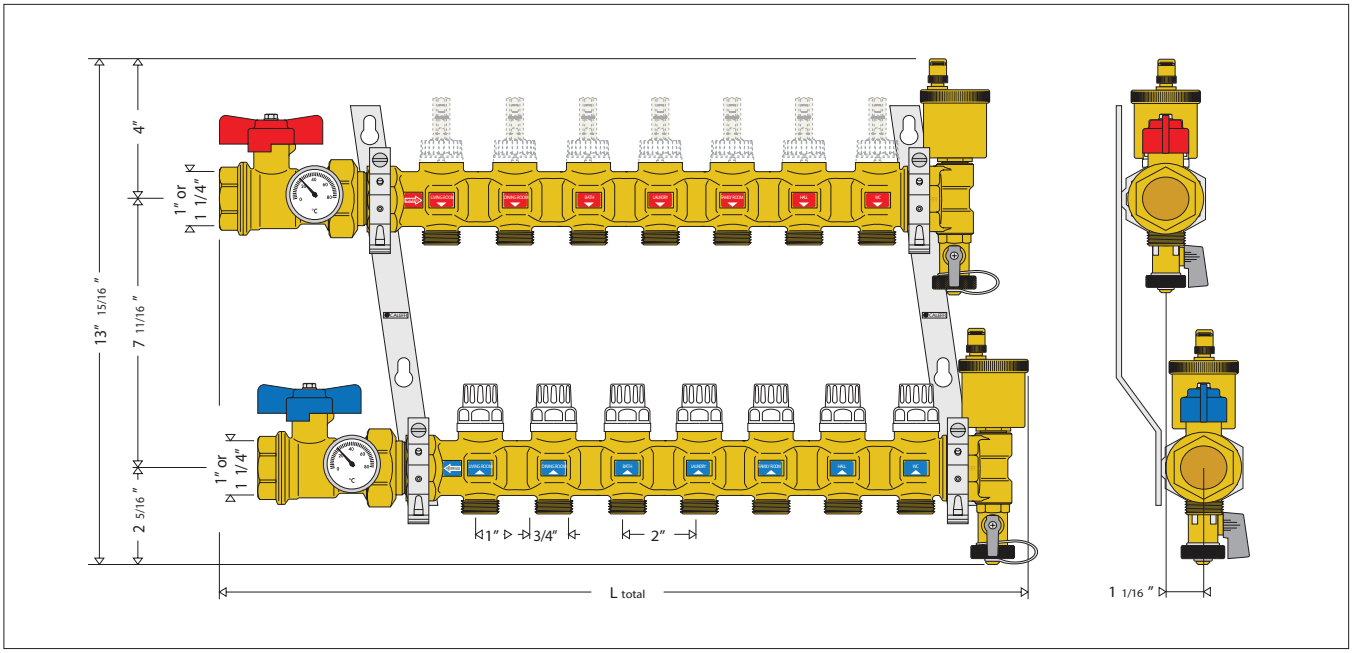
tech. broch. 01170

Pre-assembled radiant manifold consisting of return distribution manifold complete with built-in shut-off valves suitable for thermo-electric actuator and supply distribution manifold complete with built-in sight flow meters and balancing valves with 2" gauges 30—210°F scale.
1" or 1¼" NPT inlet ball valves.
Temperature gauges.
Max. working pressure: 150 psi.
Max. working temperature: 180°F.
Max: peak temperature: 200°F.
Loop Cv: 1.23 (combined supply & return ports).
Flow meter scale: ¼ - 2 gpm.
Outlet center distance: 2 in.



Code	Description	No.	Outlets	Lbs	USD
6686C5S1A	1"	3	¾" M	17	**764.00**
6686D5S1A	1"	4	¾" M	18	**875.00**
6686E5S1A	1"	5	¾" M	19	**986.00**
6686F5S1A	1"	6	¾" M	21	**1,097.00**
6686G5S1A	1"	7	¾" M	23	**1,208.00**
6686H5S1A	1"	8	¾" M	24	**1,319.00**
6686I5S1A	1"	9	¾" M	26	**1,430.00**
6686L5S1A	1"	10	¾" M	28	**1,541.00**
6686M5S1A	1"	11	¾" M	29	**1,652.00**
6686N5S1A	1"	12	¾" M	31	**1,763.00**
6686O5S1A	1"	13	¾" M	33	**1,875.00**
6687C5S1A	1¼"	3	¾" M	17	**810.00**
6687D5S1A	1¼"	4	¾" M	18	**921.00**
6687E5S1A	1¼"	5	¾" M	19	**1,033.00**
6687F5S1A	1¼"	6	¾" M	21	**1,142.00**
6687G5S1A	1¼"	7	¾" M	23	**1,254.00**
6687H5S1A	1¼"	8	¾" M	24	**1,365.00**
6687I5S1A	1¼"	9	¾" M	26	**1,476.00**
6687L5S1A	1¼"	10	¾" M	28	**1,587.00**
6687M5S1A	1¼"	11	¾" M	29	**1,698.00**
6687N5S1A	1¼"	12	¾" M	31	**1,809.00**
6687O5S1A	1¼"	13	¾" M	33	**1,920.00**

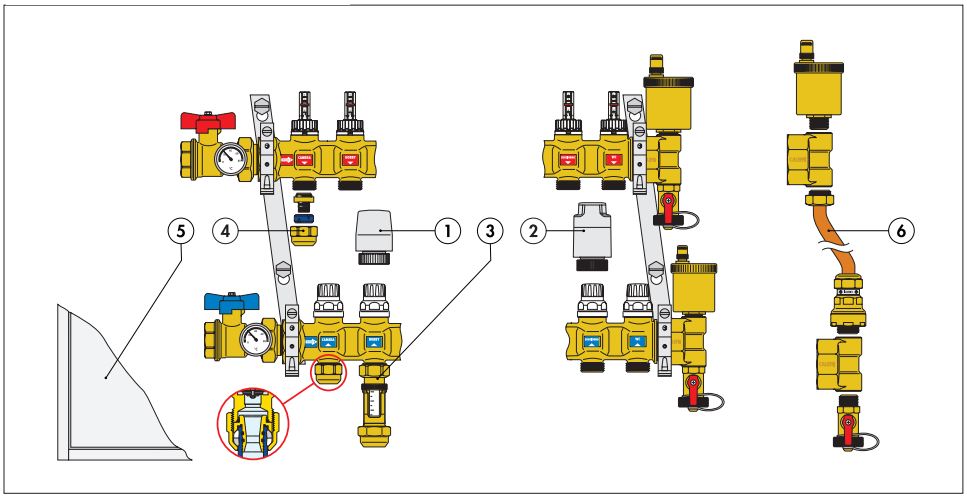
Consult factory for inverted assembly options.



Code (1")	**668**6C5S1A	**668**6D5S1A	**668**6E5S1A	**668**6F5S1A	**668**6G5S1A	**668**6H5S1A	**668**6I5S1A	**668**6L5S1A	**668**6M5S1A	**668**6N5S1A	**668**6O5S1A
Code (1¼")	**668**7C5S1A	**668**7D5S1A	**668**7E5S1A	**668**7F5S1A	**668**7G5S1A	**668**7H5S1A	**668**7I5S1A	**668**7L5S1A	**668**7M5S1A	**668**7N5S1A	**668**7O5S1A
No. outlets	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Total length	15 3/16"	171/8"	19"	21"	23"	25"	28 1/8"	30 1/8"	32 1/16 "	34 1/16"	36"

BRASS DISTRIBUTION MANIFOLDS

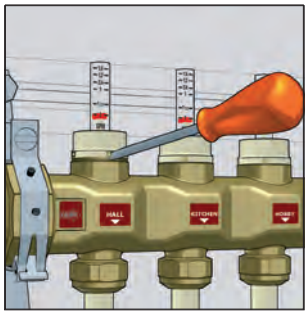
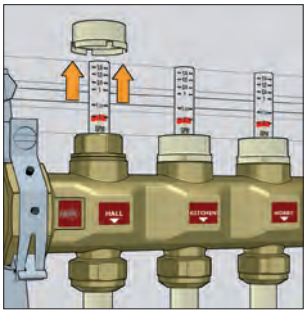
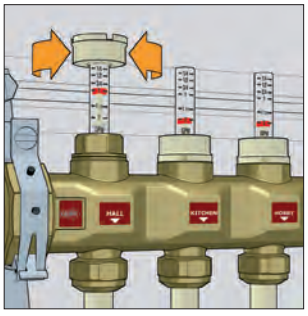
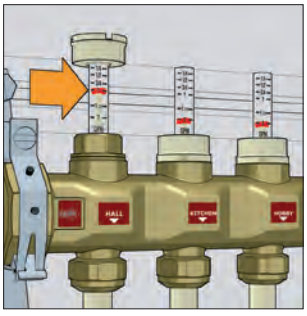
Manifolds and accessories



1. Thermo-electric actuator 6564 series
2. Thermo-electric actuator with manual open handle, 6563 series
3. Flow meter, code NA669
4. Self-adjusting Universal PEX fitting, 680, 682 series
5. Inspection wall box, 659 series
6. Differential by-pass kit, code 668000

Flow rate adjustment and reading

Raise the block cover with the aid of a screwdriver and turn it over onto the flow meter. Adjust the flow rate of the single panels by turning the flow meter body acting on the built-in balancing valve.
The flow rate must be read off the graduated scale, expressed in gpm, printed on the flow meter.
After making all the adjustments, reposition and lock all the knobs in their seat to prevent tampering.

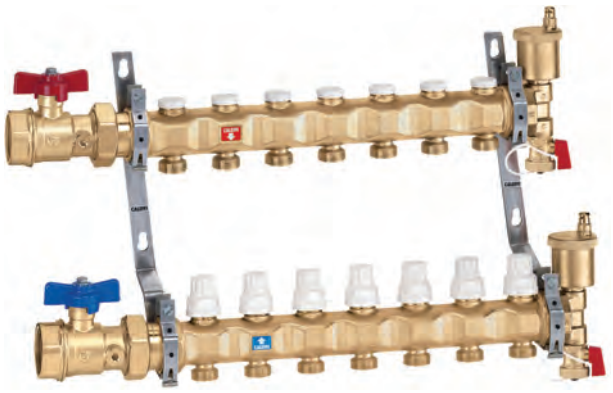





DISTRIBUTION MANIFOLDS

663
Pre-assembled distribution assembly

tech. broch. 01170

Pre-assembled distribution assembly consisting of return distribution manifold complete with built-in shut-off valves suitable for thermo-electric actuator and supply distribution manifold complete with manually-adjustable balancing valves.
1" or 1¼" NPT inlet ball valves.
Loop Cv: 2.3 (combined supply & return ports).
Max. working pressure: 150 psi.
Max: temperature: 210°F.
Outlet center distance: 2 in.

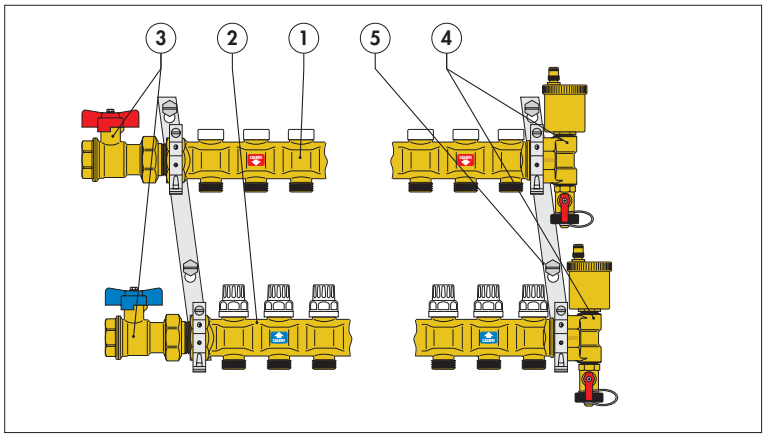


Code	Description	No.	Outlets	Lbs	USD
6636C5A	1"	3	¾" M	17	**625.00**
6636D5A	1"	4	¾" M	18	**722.00**
6636E5A	1"	5	¾" M	19	**819.00**
6636F5A	1"	6	¾" M	21	**916.00**
6636G5A	1"	7	¾" M	23	**1,013.00**
6636H5A	1"	8	¾" M	24	**1,111.00**
6636I5A	1"	9	¾" M	26	**1,208.00**
6636L5A	1"	10	¾" M	28	**1,305.00**
6636M5A	1"	11	¾" M	29	**1,402.00**
6636N5A	1"	12	¾" M	31	**1,499.00**
6636O5A	1"	13	¾" M	33	**1,596.00**
6636P5A	1"	14	¾" M	35	**1,875.00**

Consult factory for inverted assembly options.

Code	Description	No.	Outlets	Lbs	USD
6637C5A	1¼"	3	¾" M	17	**666.00**
6637D5A	1¼"	4	¾" M	18	**762.00**
6637E5A	1¼"	5	¾" M	19	**859.00**
6637F5A	1¼"	6	¾" M	21	**957.00**
6637G5A	1¼"	7	¾" M	23	**1,054.00**
6637H5A	1¼"	8	¾" M	24	**1,151.00**
6637I5A	1¼"	9	¾" M	26	**1,248.00**
6637L5A	1¼"	10	¾" M	28	**1,345.00**
6637M5A	1¼"	11	¾" M	29	**1,442.00**
6637N5A	1¼"	12	¾" M	31	**1,540.00**
6637O5A	1¼"	13	¾" M	33	**1,637.00**
6637P5A	1¼"	14	¾" M	35	**1,923.00**

Consult factory for inverted assembly options.



663 manifold components

1 Supply manifold (complete with manually adjustable balancing valves only for 663 series).

2 Return manifold complete with shut-off valves that can be used with thermoelectric actuators.

3 Shut-off ball valves

4 End fittings consisting of a 3-way end fitting, automatic air vent valve and drain valve.

5 Pair of mounting brackets for use with series 659 boxes or direct wall installation.

MANIFOLDS MIXING STATIONS

Motorized mixing station

tech. broch. 01154

Complete with three-point floating type actuator for use with separately-sourced outdoor reset controller.
For field assembly to a Caleffi radiant manifold assembly.
Grundfos UPS 15—58 three-speed pump or Alpha 25-55U.
1" NPT male adapters included to connect to manifold.
¾" NPT female riser connections.
Includes built-in hydraulic separator.

Code	Description	Lbs	USD
NA17156HE	Motorized mixing, Alpha 25-55U	5.3	**1,895.00**
NA17156	Motorized mixing, UPS 15-58u	5.3	**1,580.00**
NA16002	Alpha 25-55U replacement pump	2.3	**657.30**
NA10038	UPS 15-58U replacement pump	2.3	**323.40**

Thermostatic mixing station

tech. broch. 01155

For field assembly to a Caleffi radiant manifold assembly.
Grundfos UPS 15—58 three-speed pump or Alpha 25-55U.
1" NPT male adapters included to connect to manifold.
¾" NPT female riser connections.
Includes built-in hydraulic separator.

Code	Description	Lbs	USD
NA17256HE	Thermostatic mixing, Alpha 25-55U	4.1	**1,533.00**
NA17256	Thermostatic mixing, UPS 15-58	4.1	**1,202.00**
NA16002	Alpha 25-55U replacement pump	2.3	**657.30**
NA10038	UPS 15-58U replacement pump	2.3	**323.40**

MIXING VALVE FOR CENTRALIZED SYSTEMS

NA164 3-way - 24 V AC motorized 3-wire control temperature mixing valve

Motorized mixing valve for hydronic systems or in radiant panel heating systems. Operates on a control signal from a separately-sourced outdoor reset controller. High flow rate. No swings due to sudden changes in thermal load.
Installation flexibility with reversible cold inlet port and straight through flow direction from hot inlet to mixed outlet.
Brass body.
Max. working pressure: 200 psi.
Temperature range: 40—210°F.
Power supply: 24 V AC.
Power consumption: 8 W.
Rating of micro-switch contacts: 5 A (24 V).

Code	Description	Cv	Lbs	USD
NA16469	1" sweat unions, floating	7.7	5.8	**1040.00**
F19149	Replacement actuator 3-wire floating		1.8	**420.00**

NA163 3-way fixed temperature mixing valve

Adjustable thermostatic mixing valve for boiler protection and low temperature mixing. Installation flexibility with reversible cold inlet port and straight through flow direction from hot inlet to mixed outlet.
Brass body.
Max. working pressure: 200 psi.
Max. inlet temperature: 185°F.
Adjustable range: 80—130°F.

Code	Description	Cv	Lbs	USD
NA16369	1" sweat unions	3.9	4.8	**820.00**

BOXES FOR DISTRIBUTION MANIFOLDS

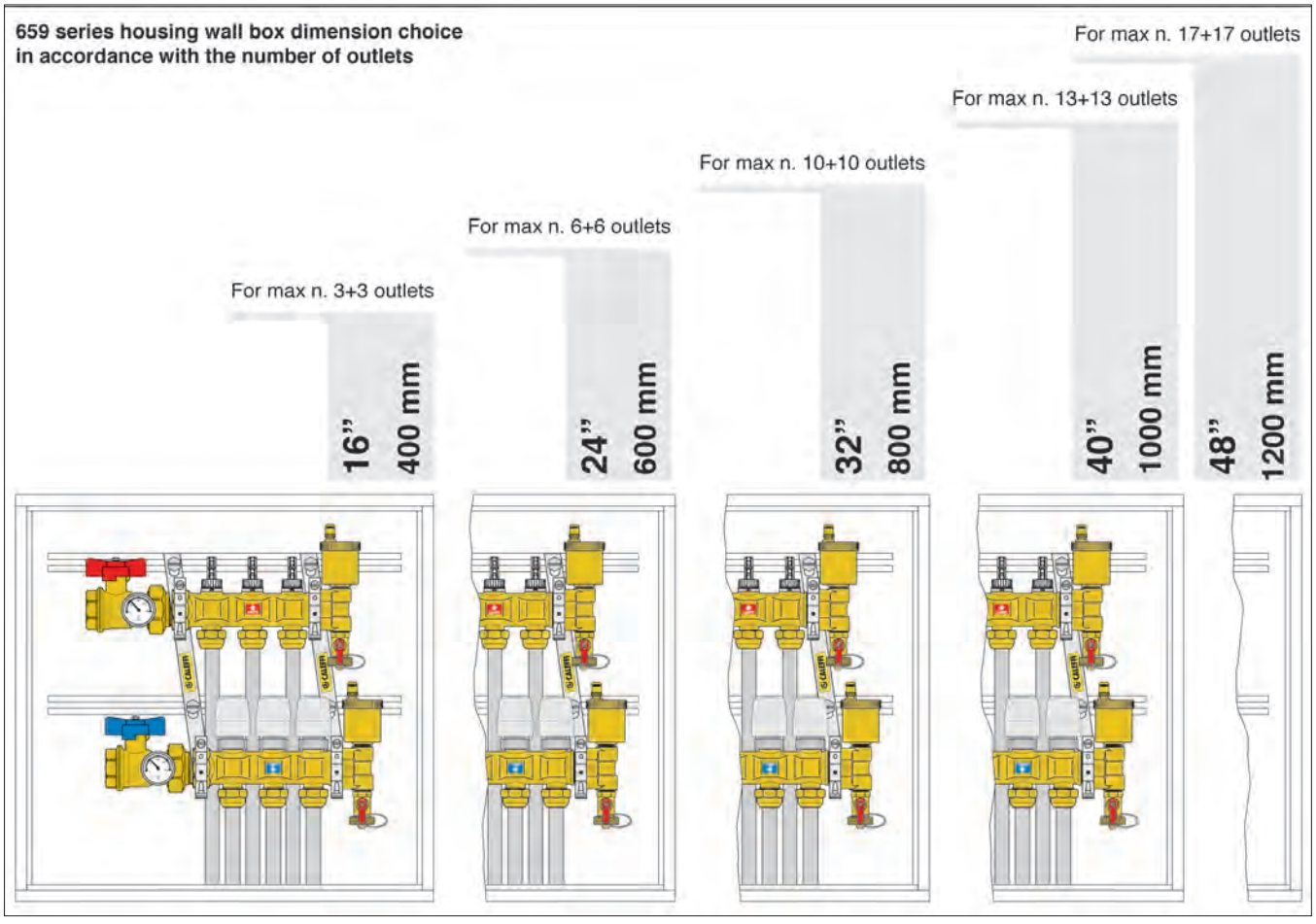
659
Manifold cabinet

tech. broch. 01170

Housing wall box fits manifolds 663 and 668S1 series.
Adjustable depth: 4⅜"— 5½".
Power coated painted 18 gauge sheet metal.
With push-fit clamp.

Code	Description	H	Max Outlets	Lbs	USD
659044	16" width	20"	3	17	**403.30**
659064	24" width	20"	6	23	**438.80**
659084	32" width	20"	10	30	**517.00**
659104	40" width	20"	13	37	**595.00**
659124	48" width	20"	17	44	**672.00**

Rough opening dimensions



FITTINGS FOR DISTRIBUTION MANIFOLDS AND MIXING STATIONS


(680504A shown)

680 Universal PEX fittings

tech. broch. 01170

680 series fittings are compatible with any ASTM F876 single layer PEX.
Max. working pressure: 150 psi.
Working temperature range for ASTM F876 PEX piping: 40—180°F.

Code	Description	Compression ring	Lbs	USD
680507	5/16" nominal PEX	Blue	0.2	**12.40**
680503A	3/8" nominal PEX	Black	0.2	**12.40**
680504A	1/2" nominal PEX	Blue	0.2	**12.40**
680555A	5/8" nominal PEX	Black	0.2	**12.40**
680505A	3/4" nominal PEX	Brass	0.2	**12.40**


(682530A shown)

682 Universal PEX-AL-PEX fittings

682 series fittings are compatible with any ASTM F1281 multilayer PEX-AL-PEX pipe.
Max. working pressure: 150 psi.
Working temperature range for ASTM F1281 PEX-AL-PEX piping: 40—200°F with tubing rated 200°F.

Code	Description	Lbs	USD
682530A	3/8" nominal PEX-AL-PEX	0.2	**12.80**
682540A	1/2" nominal PEX-AL-PEX	0.2	**12.80**
682545A	5/8" nominal PEX-AL-PEX	0.2	**13.80**
682550A	3/4" nominal PEX-AL-PEX	0.2	**24.40**

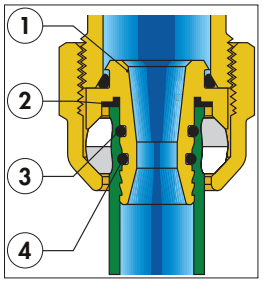
Construction details
There is a large variety of PEX and PEX-AL-PEX pipes available with a wide range of permissible tolerances. This fitting is designed to adapt to several pipe diameters tolerances. The innovative solution for mechanical fittings has been constructed so that the same fitting can be used for pipes with difference external diameters tolerances and differences on internal diameters tolerances while maintaining the nominal dimensions.

Resistance to pull out
This fitting offers a high degree of resistance to pull out of pipe. Its special clamping system makes it suitable for every application and ensures a leak tight fit.

Low pressure losses
The internal profile of the adapter (1) is shaped to obtain a Venturi effect when the fluid passes through, reducing pressure losses by 20% compared to a similar diameter.

Insulation ring
The fitting is equipped with a rubber insulation element (2) to prevent contact between the aluminium in PEX-AL-PEX pipe and the brass fitting, thus preventing galvanic corrosion generated by the two different metals.

Dual O-ring seal
The adapter is equipped with two O-ring seals (3) and (4) in EPDM to prevent leaks even when operating at high pressure.



NA102

Sweat connection fitting fits 1/2" copper.
Max. working pressure: 150 psi.
Working temperature range: 41—250°F.
Chrome plated nut.

Code	Description	Lbs	USD
NA10262	1/2" sweat	0.2	**13.90**

NA103

NPT connection fitting.
Max. working pressure: 150 psi.
Working temperature range: 41—250°F.
Chrome plated nut.

Code	Description	Lbs	USD
NA10313	1/2" NPT male	0.2	**15.00**

386

tech. broch.01170

Cap to plug unused manifold outlets on 592, 663 and 668S1 series.

Code	Description	Lbs	USD
386500	3/4" straight thread	0.2	**12.40**

Double nipple for coupling PEX fittings.

Code	Description	Lbs	USD
942550	3/4" x 3/4" thread	0.1	**15.50**

Wrench for tightening PEX fitting to manifolds.

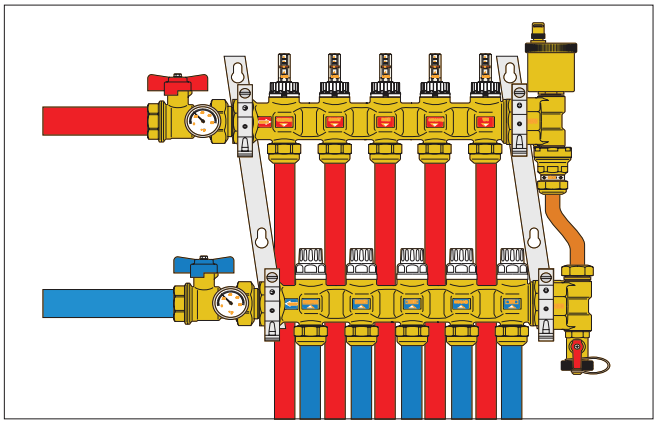
Code	Description	Lbs	USD
387100	26 mm x 30 mm	1.5	**59.40**

668

tech. broch. 01170

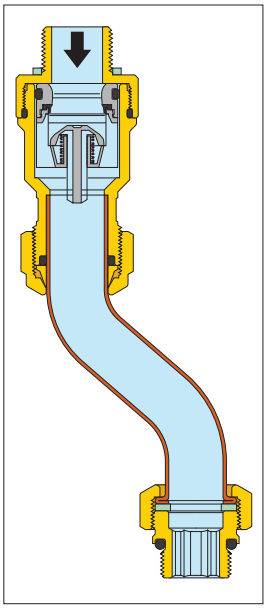
Off-center by-pass assembly with fixed crack setting of 3.6 psi differential pressure.
Max working pressure: 150 psi.
Working temperature range: 15—230°F.

Code	Description	Lbs	USD
668000	½" x ½"	0.5	**117.80**



The by-bass valve contains a check valve connected to a contact spring. When the fixed setting pressure is reached, the valve disk gradually opens, recirculating the flow in proportion to the closing of the thermo-electric valves and maintaining a constant differential pressure in the manifold circuit.

The differential by-pass assembly features a fixed setting that cannot be changed. The small, compact size and offset connections makes this kit particularly easy to mount after installing thermo-electric valves on the manifold. It does not require a larger or deeper zone box than those used for normal manifolds.



6564

tech. broch. 01198

Low current draw thermo-electric actuator for use with 663 and 668S1 series distribution manifolds
Hermetically sealed for upside down installation..
Pop-up feature
Power supply: 24 V AC/DC.
Initial current draw: ≤ 250 mA.
Power consumption: 3 W.
Rating of micro-switch contacts: 5 A (24 V).
31.5" wire lead connection.

Code	Description	Lbs	USD
656404	24 V AC/DC	0.4	**103.30**
656414	24 V AC/DC with micro-switch	0.4	**129.20**

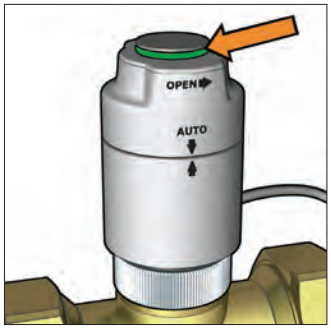
6563 TwisTop™

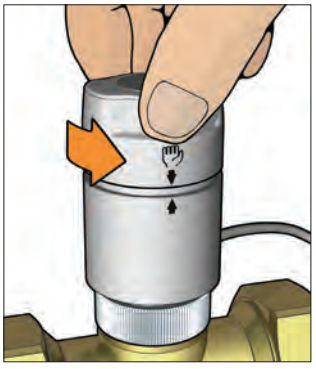
tech. broch. 01170

TwisTop™ thermo-electric actuator for use with return manifolds.
Twist the top to manually open.
Power supply: 24 V AC/DC.
Initial current draw: 800 mA.
Power consumption: 3 W.
Rating of micro-switch contacts: 5 A (24 V).
31.5" wire lead connection.
US Patent 7,617,989 B2.

Code	Description	Lbs	USD
656304	24 V AC/DC	0.4	**137.70**
656314	24 V AC/DC with micro-switch	0.4	**163.40**
656314R	24 V AC/DC with micro-switch Rehau	0.4	**178.10**

**Simply twist to manually open actuator (and activate auxiliary switch on 656314).
When power is applied, it returns to Auto position.**





Green ring indicates valve is open.

ACCESSORIES

Replacement balance/flow meter fits 668S1 series manifold.
Flow meter scale: ¼ — 2 gpm.

Code	Description	Lbs	USD
F69600	Fits 668S1 supply manifold	0.2	**36.30**

Replacement shut-off valve fits 668 S1 series manifold.

Code	Description	Lbs	USD
F69590	Fits 668 S1 return manifold	0.3	**29.00**

Replacement balancing valve fits 668 series manifold.

Code	Description	Lbs	USD
69184	Fits 668 supply manifolds	0.2	**25.30**

Replacement shut-off valve fits 668 & 663 series manifold.

Code	Description	Lbs	USD
69122 CST	Fits 668 & 663 return manifold	0.3	**16.20**

Replacement balancing valve for 663 series manifold.

Code	Description	Lbs	USD
R69176	Fits 663 supply manifold	0.3	**24.80**

669

tech. broch. 01170

Flow meter fits manifolds.
Max: temperature: 180°F (669050).
Max: temperature: 210°F (NA669 series).
¾" straight male x ¾" straight female connections.

Code	Description	Lbs	USD
669050	1 — 4 LPM	0.4	**42.80**
NA669150	¼ — 1 GPM High Temp.	0.3	**42.80**
NA669250	½ — 2 GPM High Temp.	0.3	**42.80**

White replacement knob fits 663 and 668S1 series manifolds.

Code	Description	Lbs	USD
449000	Knob	0.5	**12.50**

5020

tech. broch. 01090

Replacement air vent fits radiant manifolds.
Brass body.
Hygroscopic safety air vent cap.
Max. working pressure: 150 psi
Max discharge pressure: 60 psi
Max. working temperature: 250°F.

Code	Description	Lbs	USD
502043 CST	½" straight thread	0.6	**31.90**

Plastic replacement/test cap fits 5020 series.

Code	Description	Lbs	USD
R56214	Vent cap	0.1	**2.60**

675

tech. broch.01170

Snap-on thermometer directly to PEX, PEX-AL-PEX and copper piping.

Code	Description	Lbs	USD
675900A	½" & ⅝" PEX & ½" copper	0.2	**13.50**
R69413	Syringe of thermo conductive paste	0.1	**9.50**

688

Temperature gauge with well pocket fitting for inserting into manifold ball valves.
Working Temperature range: 30—210° F.
Face dial diameter: 2".

Code	Description	Lbs	USD
688003A	Gauge with pocket well	0.2	**50.30**
F11344	Replacement pocket well, low lead	0.1	**5.00**
F67037	O-ring fits F11344	0.1	**1.15**

FILL AND FLUSH CART

NA25510 HYDROFLUSH™

tech. broch. 01280

The fill and flush pump cart is portable, leak-tested for a safe, quick and clean way to fill and flush solar, geo thermal and hydronic systems.
Medium: water, glycol and cleaning fluids.
Tank: 13 gallon with dirt filter.
Max. tank medium temperature: 150°F.
Pump delivery flow: 1—13 gpm
Pump feet of head: 220
Max. pump pressure: 100 psi.
Pump power: ½ HP (120 V AC).
Isolating ball valves: ¾" garden hose thread.
Transfer hoses: 6' with ¾" GHT (2 ea).
Pressure gauge: 2" dial, 0—100 psi.
Dimensions: 48"H × 20"W × 18"D.

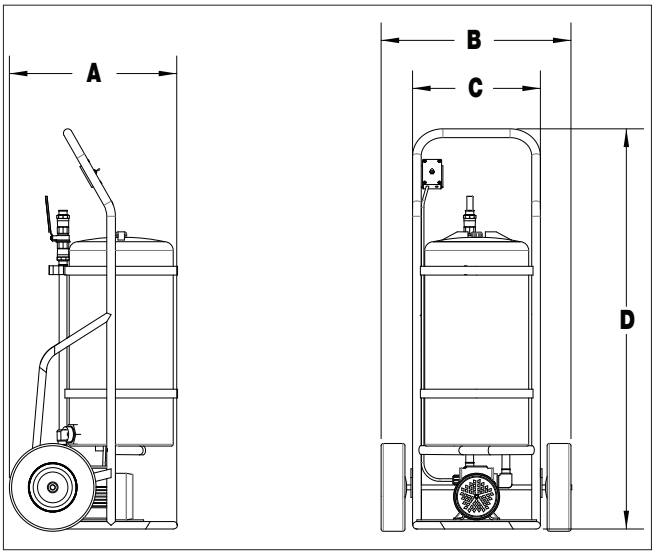
Code	Description	Lbs	USD
NA25510	Fill and flush cart	60	**2,772.00**

Operating principles

The fill and flush pump cart is portable and leak-tested for a safe, quick and clean way to fill and flush solar, geothermal and hydronic systems. HYDROFLUSH™ with a leak test pressure gauge, the Fill and Flush cart makes it easy to test a system.

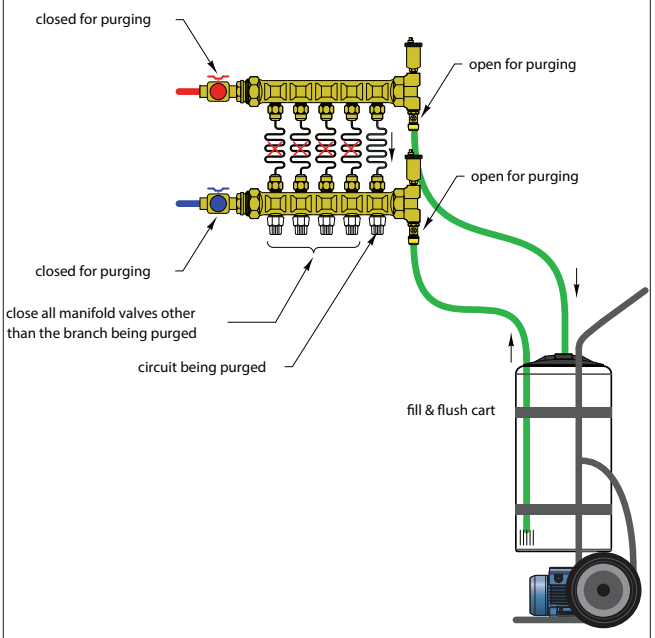
Connect the fill/purge valves to the fill and flush system, allow fluid to circulate and remove air and dirt in system. Pump system to desired pressure, use the liquid pressure gauge to observe system pressure. If the system holds its pressure, the system is leak free.

Dimensions:

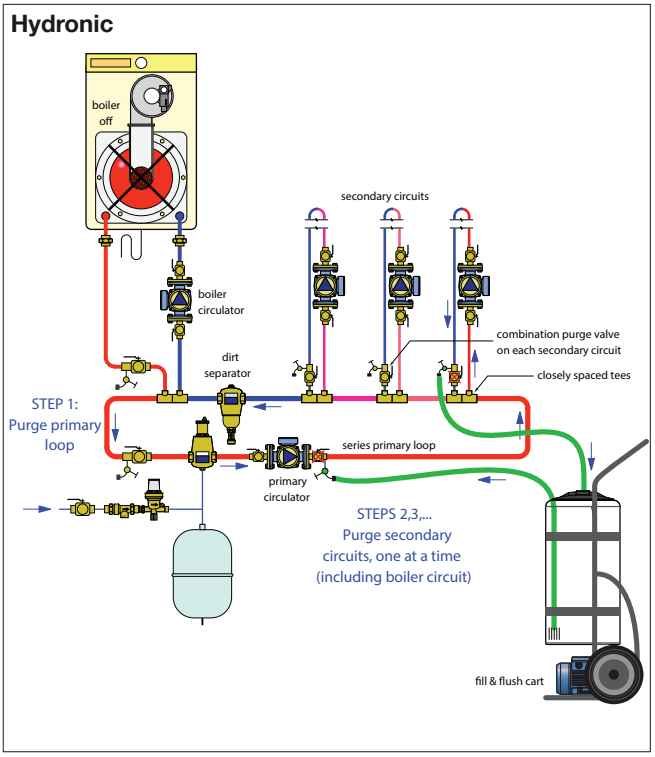


Code	A	B	C	D	Weight	Capacity
NA25510	20 ½"	20 ¼"	13 ¾"	46 ¾"	65 lbs.	13 gallon

Radiant

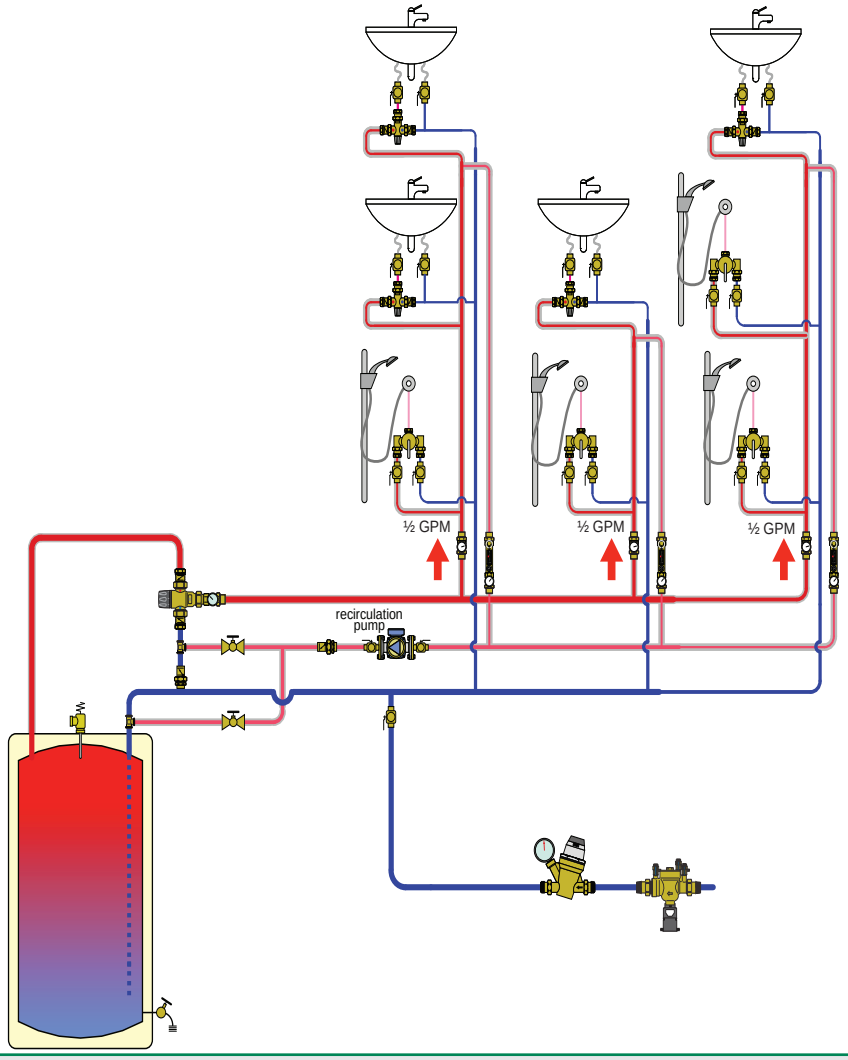


Hydronic



VALVES FOR DOMESTIC WATER SYSTEMS

This diagram is an example



Low lead thermostatic mixing valves, MixCal™

Low lead scald protection thermostatic mixing valves

Low lead high flow thermostatic mixing valves

Low lead pre-adjustable pressure reducing valves

Low lead balancing valve with flow meter, QuickSetter+™

LOW LEAD THERMOSTATIC MIXING VALVES

521 MixCal™ Sweat

tech. broch. 01050

Adjustable thermostatic and pressure balanced mixing valve for point of distribution in domestic water systems and radiant hydronic heating systems.
Low-lead brass body and fittings..
Locking set point knob.
Max. working pressure: 200 psi.
Max. inlet temperature: 200ºF.
Adjustable range: 85—150ºF.
Min. flow for optimum performance: 1.3 gpm.
Meets requirements of ANSI/NSF 372-2011.
Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1017

Code	Description	Cv	Lbs	USD
521409A	½" sweat	3	2.4	**248.20**
521409AC	½" sweat inlet check valves	3	2.4	**273.60**
521509A	¾" sweat	3	2.4	**259.50**
521509AC	¾" sweat inlet check valves	3	2.4	**296.60**
521609A	1" sweat	3	2.4	**309.10**
521609AC	1" sweat inlet check valves	3	2.4	**346.20**

521 MixCal™ Sweat

tech. broch. 01050

Adjustable thermostatic and pressure balanced mixing valve for point of distribution in domestic water systems and radiant hydronic heating systems.
Low-lead brass body.
Locking set point knob.
Max. working pressure: 200 psi.
Max. inlet temperature: 200ºF.
Adjustable range: 85—150ºF.
Min. flow for optimum performance: 1.3 gpm.
Gauge scale: 30—210ºF.
Gauge accuracy: ± 6ºF.
Gauge dial: 2" diameter.
Meets requirements of ANSI/NSF 372-2011.
Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1017

Code	Description	Cv	Lbs	USD
521419A	½" sweat	3	2.9	**294.40**
521419AC	½" sweat inlet check valves	3	2.9	**319.80**
521519A	¾" sweat	3	2.9	**305.70**
521519AC	¾" sweat inlet check valves	3	2.9	**342.60**
521619A	1" sweat	3	2.9	**352.00**
521619AC	1" sweat inlet check valves	3	2.9	**388.90**

521 MixCal™ NPT

tech. broch. 01050

Adjustable thermostatic and pressure balanced mixing valve for point of distribution in domestic water systems and radiant hydronic heating systems.
Locking set point knob.
Max. working pressure: 200 psi.
Max. inlet temperature: 200ºF.
Adjustable range: 85—150ºF.
Min. flow for optimum performance: 1.3 gpm.
Meets requirements of ANSI/NSF 372-2011.
Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1017

Code	Description	Cv	Lbs	USD
521400A	½" NPT male	3.2	2.4	**259.50**
521400AC	½" NPT male inlet check valves	3.2	2.4	**284.90**
521500A	¾" NPT male	3.2	2.4	**270.80**
521500AC	¾" NPT male inlet check valves	3.2	2.4	**307.90**
521600A	1" NPT male	3.2	2.4	**321.60**
521600AC	1" NPT male inlet check valves	3.2	2.4	**358.70**

521 MixCal™ NPT

tech. broch. 01050

Adjustable thermostatic and pressure balanced mixing valve for point of distribution in domestic water systems and radiant hydronic heating systems.
Low-lead brass body.
Locking set point knob.
Max. working pressure: 200 psi.
Max. inlet temperature: 200ºF.
Adjustable range: 85—150ºF.
Min. flow for optimum performance: 1.3 gpm.
Gauge scale: 30—210ºF.
Gauge accuracy: ± 6ºF.
Gauge dial: 2" diameter.
Meets requirements of ANSI/NSF 372-2011.
Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1017

Code	Description	Cv	Lbs	USD
521410A	½" NPT male	3	2.9	**305.70**
521410AC	½" NPT male inlet check valves	3	2.9	**331.10**
521510A	¾" NPT male	3	2.9	**317.00**
521510AC	¾" NPT male inlet check valves	3	2.9	**353.90**
521610A	1" NPT male	3	2.9	**364.50**
521610AC	1" NPT male inlet check valves	3	2.9	**401.40**

LOW LEAD THERMOSTATIC MIXING VALVES

521 MixCal™ Press

tech. broch. 01050

Adjustable thermostatic and pressure balanced mixing valve for point of distribution in domestic water systems and radiant hydronic heating systems.
Low-lead brass body.
Locking set point knob.
Max. working pressure: 200 psi.
Max. inlet temperature: 200ºF.
Adjustable range: 85—150ºF.
Min. flow for optimum performance: 1.3 gpm.
Gauge scale: 30—210ºF.
Gauge accuracy: ± 6ºF.
Gauge dial: 2" diameter.
Meets requirements of ANSI/NSF 372-2011. Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1017

Code	Description	Cv		Lbs	USD
521406A	½" Press	3		2.4	**264.70**
521416A	½" Press with gauge	3		2.9	**310.90**
521506A	¾" Press	3		2.4	**271.40**
521516A	¾" Press with gauge	3		2.9	**317.60**
521506AC	¾" Press inlet check valves	3	NEW	2.5	**325.70**
521516AC	¾" Press w/gauge/inlet checks	3	NEW	3.0	**381.00**
521606A	1" Press	3		2.6	**327.70**
521616A	1" Press with gauge	3		3.1	**370.60**

Check valve fits only Presscon™ fittings 521506AC, 521516AC, NA16265LC, NA10419 and NA10419C
(Priced each, sold in package of 10)

Code	Description		Lbs	USD
NA10405	Check valve insert	NEW	0.1	**4.20**

521 MixCal™ Body

tech. broch. 01050

Replacement body.
Meets requirements of ANSI/NSF 372-2011. Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1017

Code	Description	Cv	Lbs	USD
521101A	1" male union thread	3	1.9	**192.70**

Point of distribution mixed temperature gauge adaptor fits MixCal™ 521 series mixing valves. Threaded union mounting replaces existing mixed outlet with ¾" or 1" sweat pipe connection. Removable gauge fits into temperature well. Gauge dial is 2" diameter and scale from 30—210ºF.
Certified: Low-lead brass.

Code	Description	Lbs	USD
NA10328	½" sweat with gauge	0.4	**73.80**
NA10056	¾" sweat with gauge	0.4	**81.10**
NA10058	1" sweat with gauge	0.4	**89.00**
NA10358	1" union thread with gauge	0.5	**90.50**
688003A	Replacement gauge	0.2	**50.30**

Check valve for 521 and 5213 mixing valves. (Priced each, sold in package of 10)

Code	Description	Lbs	USD
R39204	Check valve insert	0.1	**4.20**

Conical inlet filter for 521 and 5213 mixing valves. (Priced each, sold in package of 10)

Code	Description	Lbs	USD
F52429	Conical filter	0.1	**5.00**

LOW LEAD HIGH FLOW THERMOSTATIC MIXING VALVES

ASSE 1017 model 5231 series high flow thermostatic mixing valves for centralized systems are designed to be installed at the hot water heater (point of distribution). For safety reasons, it is advisable to limit the maximum mixed water temperature to 120°F. Series 5231 thermostatic mixing valves can also be used for regulating the flow temperature in radiant panel heating systems, to which it assures a constant and accurate control with ease of installation.

5231 High Flow Sweat

tech. broch. 01256

Adjustable thermostatic mixing valve for domestic water systems and radiant hydronic systems. DZR low lead brass body.
Max. working pressure: 200 psi.
Max. inlet temperature: 195ºF.
Adjustable range: 95—150ºF.
Meets requirements of ANSI/NSF 372-2011.
Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1017

Code	Description	Min. Flow (gpm)	Cv	Lbs	USD
523168A	1" sweat	4.4	7.0	7.0	**1,276.00**
523178A	1¼" sweat	4.4	7.6	7.0	**1,495.00**
523188A	1½" sweat	8.8	13.0	17	**2,102.00**
523198A	2" sweat	8.8	14.2	18	**2,416.00**

5231 High Flow NPT

tech. broch. 01256

Adjustable thermostatic mixing valve for domestic water systems and radiant hydronic systems. DZR low lead brass body.
Max. working pressure: 200 psi.
Max. inlet temperature: 195ºF.
Adjustable range: 95—150ºF.
Meets requirements of ANSI/NSF 372-2011.
Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1017

Code	Description	Min. Flow (gpm)	Cv	Lbs	USD
523160A	1" NPT M	4.4	7.0	7.0	**1,372.00**
523170A	1¼" NPT M	4.4	7.6	7.0	**1,570.00**
523180A	1½" NPT M	8.8	13.0	17	**2,177.00**
523190A	2" NPT M	8.8	14.2	18	**2,492.00**

5231 High Flow Body

tech. broch. 01256

Replacement body.
Meets requirements of ANSI/NSF 372-2011.
Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1017

Code	Description	Min. Flow (gpm)	Cv	Lbs	USD
523179A	1½" union thread	4.4	7.6	5.0	**1,266.00**
523199A	2½" union thread	8.8	14.2	15.0	**1,936.00**

*Includes no fittings or union nuts.

5231 High Flow Sweat

tech. broch. 01256

Adjustable thermostatic mixing valve for domestic water systems and radiant hydronic systems. DZR low lead brass body.
Max. working pressure: 200 psi.
Max. inlet temperature: 195ºF.
Adjustable range: 95—150ºF.
Gauge scale: 30—210ºF.
Gauge accuracy: ± 6ºF.
Gauge dial: 2" diameter.
Meets requirements of ANSI/NSF 372-2011.
Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1017

Code	Description	Min. Flow (gpm)	Cv	Lbs	USD
523177A	1¼" sweat	4.4	7.6	9.0	**1,583.00**

Point of distribution mixed temperature gauge adaptor fits High Flow 5231 series mixing valves. Threaded union mounting replaces existing mixed outlet with 1¼" sweat pipe connection. Removable gauge fits into temperature well. Gauge dial is 2" diameter and scale from 30—210ºF. Certified Low-lead brass.

Code	Description	Lbs	USD
NA10315	1¼" sweat with gauge	0.5	**178.90**
688003A	Replacement gauge	0.2	**50.30**

Inlet check valve assembly for installing on inlet union tail pieces of 5231 mixing valves. Stainless steel body. No Lead. Ordered separately, field installed Two examples shown below.

523177A shown with (2) NA10366

523178A shown with (2) NA10366

Code	Description	Lbs	USD
NA10366	Check valve assembly 1' and 1¼"	1.0	**78.80**
NA10367	Check valve assembly 1½" & 2"	1.5	**194.30**

LOW LEAD SCALD PROTECTION THERMOSTATIC MIXING VALVES

5213 Sweat tech. broch. 01092
Scald Protection Point-of-Use

Adjustable thermostatic and pressure balanced mixing valve for point of use where protected from scalding caused by hot water with locking set point. Complete with check valves on both hot and cold inlets.
Low-lead brass body.
Max. working pressure: 150 psi.
Max. inlet temperature: 185°F.
Adjustable range: 85—120°F.
Temperature control: ±3°F.
Min. flow for optimum performance: 0.5 gpm.
Meets requirements of ANSI/NSF 372-2011.
Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1070

Code	Description	Cv	Lbs	USD
521349A	½" sweat	2	2.0	**259.20**
521359A	¾" sweat	2	2.0	**271.00**
521369A	1" sweat	2	2.0	**323.80**

5213 NPT tech. broch. 01092
Scald Protection Point-of-Use

Adjustable thermostatic and pressure balanced mixing valve for point of use where protected from scalding caused by hot water with locking set point. Complete with check valves on both hot and cold inlets.
Low-lead brass body.
Max. working pressure: 150 psi.
Max. inlet temperature: 185°F.
Adjustable range: 85—120°F.
Temperature control: ±3°F.
Min. flow for optimum performance: 0.5 gpm.
Meets requirements of ANSI/NSF 372-2011.
Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

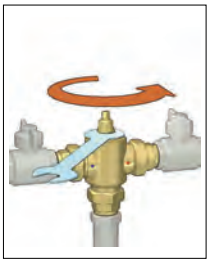
ASSE 1070

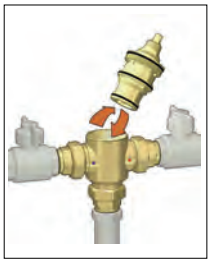
Code	Description	Cv	Lbs	USD
521342A	½" NPT male	2	2.0	**271.00**
521352A	¾" NPT male	2	2.0	**282.80**
521362A	1" NPT male	2	2.0	**335.80**

REPLACEMENT CARTRIDGE FOR DISCONTINUED 5230 VALVE

Replacement cartridge for 5230 series thermostatic mixing valves.

Code	Fits 5230…	Cv.	Lbs	USD
523005	58A,66A	4.8	1.9	**685.00**
523006	60A,68A,70A,78A	8—10	2.5	**966.00**
523008	80A,90A	17—22	4.6	**1,657.00**





Replacing the cartridge

The internal cartridge, containing all the regulating components, can be inspected and, if necessary, replaced, without the need to remove the valve body from the pipe.

1) Close the shut-off valves on the hot and cold inlets. Set the knob to the maximum value.
2) Remove the temperature regulating knob after unscrewing the lock screw at the top. Dismantle the plastic knob frame. Unscrew the brass plated protective cover by means of the hexagon (1"—1 ¼").
3) Remove the internal cartridge for inspection or replacement, using a suitably sized spanner.
4) Refit the protective brass plated cover. Refit the plastic frame in such a way that the position indicator is visible.
5) The spare cartridge is supplied pre-set to the maximum value. Position the regulating knob in such a way that the letters MAX align with the position indicator. By rotating the knob clockwise, it should be possible to adjust the value from maximum to minimum. Fix the knob with the top lock screw.
6) Reopen the shut-off valves and adjust the thermostatic mixing valve to the required temperature value.

LOW LEAD PRE-ADJUSTABLE PRESSURE REDUCING VALVES

May 2016

535H

tech. broch. 01265

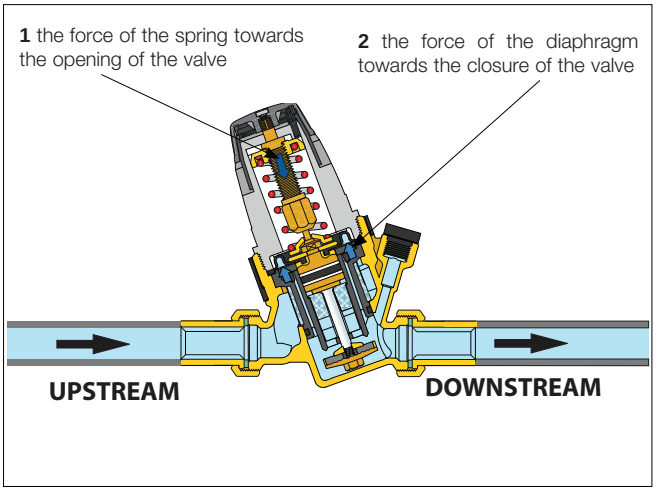
Pre-adjustable pressure reducing valve for residential and commercial applications. DZR low lead "Ecobrass" body. Unique noise reducing pressure balanced cartridge. Low friction anti-scale moving parts. High flow seat design. Dial indicator with direct readout. Replaceable cartridge. Integral stainless steel filter. Adjustment locking screw.
Max. working pressure: 300 psi (20 bar).
Max. working temperature: 180°F (80°C).
Pressure setting range: 15 — 90 psi (1 — 6 bar).
Factory setting: 45 psi (3 bar).
Certified to: ASSE 1003, CSA B356, NSF61, NSF 372, Low Lead Laws and listed by ICC-ES. Meets codes IPC, IRC & UPC for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1003

Code	Description	Flow gpm	Lbs	USD
535940HA	½" sweat	5.6	1.9	**167.00**
535941HA	½" sweat gauge	5.6	2.0	**185.00**
535340HA	½" NPT female	5.6	2.0	**182.00**
535341HA	½" NPT female gauge	5.6	2.1	**200.00**
535950HA	¾" sweat	10.0	2.2	**181.00**
535951HA	¾" sweat gauge	10.0	2.3	**199.00**
535350HA	¾" NPT female	10.0	2.3	**196.00**
535351HA	¾" NPT female gauge	10.0	2.4	**214.00**
535650HA	¾" Press	10.0	2.3	**218.00**
535651HA	¾" Press gauge	10.0	2.4	**236.00**
535960HA	1" sweat	15.9	2.9	**240.00**
535961HA	1" sweat gauge	15.9	3.0	**258.00**
535360HA	1" NPT female	15.9	3.0	**256.00**
535361HA	1" NPT female gauge	15.9	3.1	**274.00**
535970HA	1¼" sweat	25.5	5.6	**530.00**
535971HA	1¼" sweat gauge	25.5	5.7	**548.00**
535370HA	1¼" NPT female	25.5	5.7	**544.00**
535371HA	1¼" NPT female gauge	25.5	5.8	**562.00**

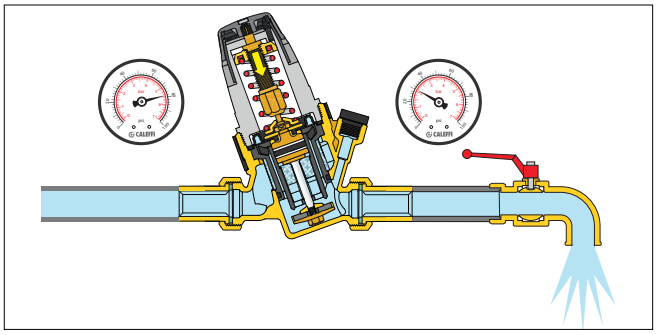
Operating principle

Operation of the pressure reducing valve is based on the balance between two opposing forces:



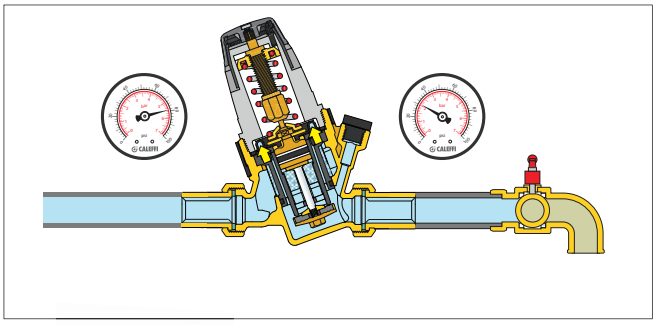
Operation with water flow

When a faucet is opened on the water system, the force of the spring becomes greater than that of the diaphragm; the shuttle moves downwards opening the valve to the flow of water.
The greater the demand for water the lower the pressure under the diaphragm with a resulting greater flow of water through the valve.



Operation without water flow

When the faucet is closed, the downstream pressure rises and pushes the diaphragm upwards. As a result the slide closes the valve to the passage of water and maintains the pressure constant at the calibrated pressure.
The slight difference in favor of the force exercised by the diaphragm, in relation to that of the spring, causes the device to close.

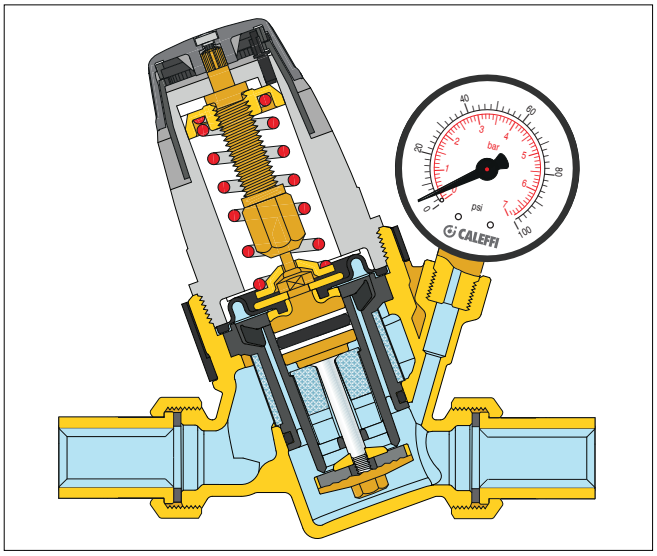


PVC jumper nipple with male union thread. The length of the jumper nipple matches the 535H valve lay length, allowing the piping to be completed prior to the installation of valve and permitting quick change out from the jumper to the valve.

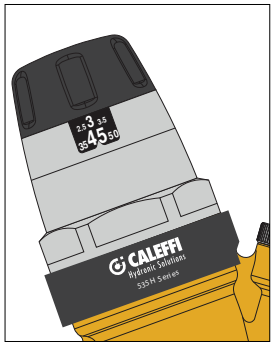
Code	Description	Lbs	USD
NA11304	Jumper nipple for 535H ½" series	0.1	**21.50**
NA11305	Jumper nipple for 535H ¾" series	0.1	**23.70**
NA11306	Jumper nipple for 535H 1" series	0.2	**25.50**
NA11307	Jumper nipple for 535H 1¼" series	0.3	**27.50**

LOW LEAD PRE-ADJUSTABLE PRESSURE REDUCING VALVES

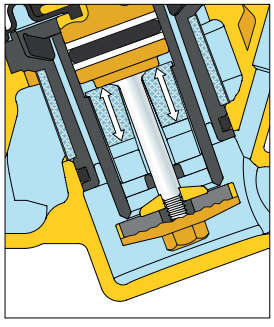
Construction details



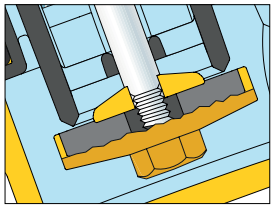
Pre-adjustment
Pressure reducing valves in the 535...H series are fitted with an operating knob and a pressure setting indicator which is visible on both sides. This pressure indicator features incremental step operation, therefore the pressure can be adjusted continuously with the value displayed at 15 psi increments.
The system pressure can therefore be pre-set to the desired value, even before the pressure reducing valve is installed.



Pressure balanced seat
Caleffi pressure reducing valves are fitted with pressure balanced seats. This means the setting pressure value remains constant, regardless of variations in the upstream pressure value. In the figure, the thrust towards the opening is counterbalanced by the force created by the closing pressure acting on the compensating piston. Since the piston has a surface area equal to the shuttle one, the two forces cancel each other out.



The special cross-section of the passage zone between the seat and shuttle seal makes for stable behavior in relation to upstream pressure fluctuations and operation with high flow rates, with reduced noise levels caused by the passage of water.



Low head losses
The internal fluid dynamic structure of the pressure reducing valve allows the achievement of very low head losses, even if a large number of faucets are opened.

Working pressures
The zone exposed to upstream pressure is constructed so that it can even operate at high pressure. The PTFE anti-extrusion rings on the compensating piston make it possible for the valve to be used continuously at upstream pressures up to 300 psi.

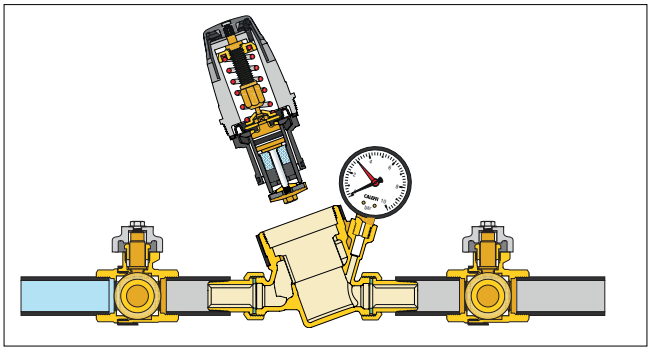
Non-sticking materials
The central support assembly, containing moving parts, is made of plastic material with a low adherence coefficient. This solution minimizes the chance of lime scale formation, a common cause of malfunctions.

Stainless steel stem
The stainless steel stem makes it possible to minimize the typical problems associated with the use of hard and aggressive water.

Contoured membrane
The membrane is designed with a special shape to assure more accurate pressure regulation in accordance with downstream pressure fluctuations.
This feature also extends the life of the valve, since the diaphragm is more resistant to sudden pressure fluctuations and to normal wear.

Compact dimensions
The “inclined” configuration makes for more compact dimensions of 535..H series pressure reducing valves with consequent easy installation, especially in domestic systems.

Removable self-contained cartridge
The cartridge containing the membrane, strainer, seat, shuttle and compensating piston is a pre-assembled self-contained unit with a cover, and can be removed to allow for inspection and maintenance procedures.
The special construction of the regulating element does not require any modification of the setting pressure value, which may be left unchanged.



High temperatures
The materials used for the construction of this series of pressure reducing valves allow installation also on the hot water circuit with temperatures of up to 180°F.

Pressure gauge
The optional pressure gauge shows the exact downstream pressure value regardless of the adjusted knob pressure setting. For special conditions, e.g. in the presence of a downstream water heater, the pressure may rise above the set value.

Certification
Series 535..H pressure reducing valves comply with the requirements of all appropriate or local standards and codes.

STATIC LOW-LEAD BALANCING VALVE WITH FLOW METER

132 QuickSetter+™

tech. broch. 01283

Balancing valve with flow meter.
Direct reading of flow rate.
No sight gauge clouding or scaling.
DZR low-lead brass.
Rotatable stainless steel flow rate adjuster.
Inlet flow check valve.
Graduated scale flow meter with magnetic movement flow rate indicator.
Meets requirements of ANSI/NSF 372-2011.
Certified to Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

Code	Description	Flow scale (gpm)	Lbs	USD
132439AFC	½" Sweat	0.5—1.75	2.0	**311.10**
132536AFC	¾" Press	0.5—1.75	1.8	**373.80**
132539AFC	¾" Sweat	0.5—1.75	1.8	**334.80**
132639AFC	1" Sweat	0.5—1.75	2.4	**386.30**
132459AFC	½" Sweat	2.0—7.0	2.0	**311.00**
132556AFC	¾" Press	2.0—7.0	1.8	**373.80**
132559AFC	¾" Sweat	2.0—7.0	1.8	**334.80**
132659AFC	1" Sweat	2.0—7.0	2.4	**386.30**

With temperature gauge:

Code	Description	Flow scale (gpm)	Lbs	USD
132438AFC	½" Sweat	0.5—1.75	2.4	**365.70**
132537AFC	¾" Press	0.5—1.75	2.2	**430.50**
132538AFC	¾" Sweat	0.5—1.75	2.2	**389.30**
132638AFC	1" Sweat	0.5—1.75	2.8	**439.80**
132458AFC	½" Sweat	2.0—7.0	2.4	**365.70**
132557AFC	¾" Press	2.0—7.0	2.2	**430.50**
132558AFC	¾" Sweat	2.0—7.0	2.2	**389.30**
132658AFC	1" Sweat	2.0—7.0	2.8	**439.80**
F19346	Replacement by-pass valve stem*		0.1	**51.20**

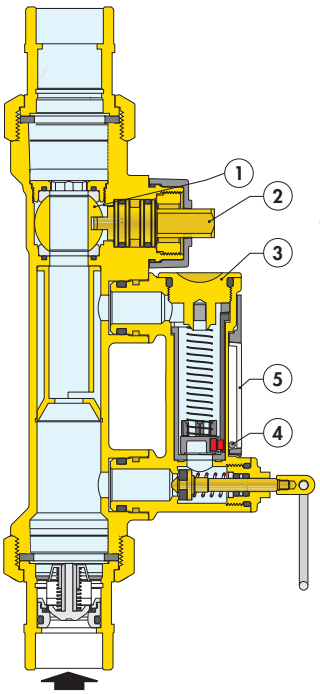
*with operating ring

Balancing made fast, easy, and accurate with QuickSetter+™

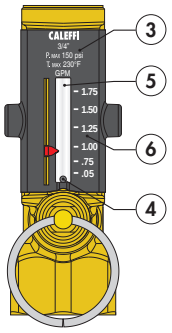
Features include:
- Three connection sizes: ½", ¾" and 1" sweat union
- Two flow range options: .5—1.75 gpm scale or 2—7 gpm scale
- Stainless steel flow adjuster
- Memory flow indicator
- Built-in flow check valve
- Temperature gauge (optional)

Connection	Flow rate (gpm)	Fully open Cv
1/2" sweat	0.5 - 1.75	1.0
3/4" sweat	0.5 - 1.75	1.0
1" sweat	0.5 - 1.75	1.0
1/2" sweat	2.0 - 7.0	6.3
3/4" sweat	2.0 - 7.0	6.3
1" sweat	2.0 - 7.0	6.3

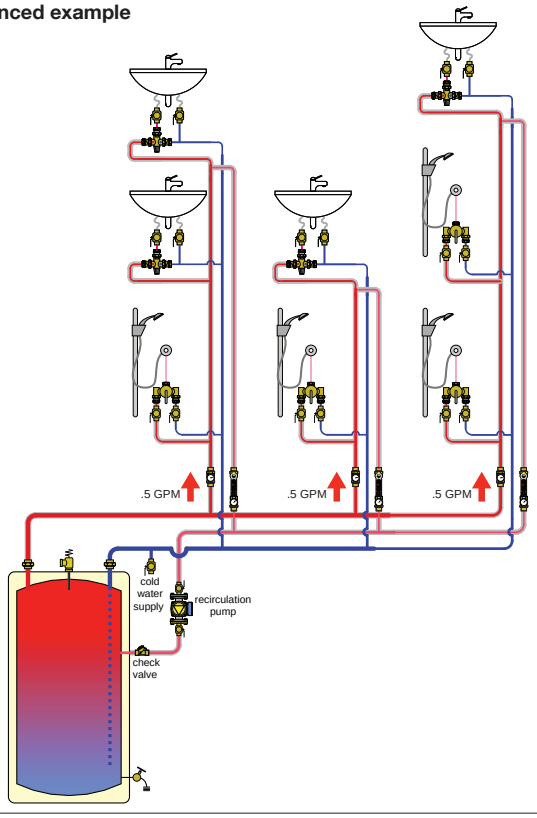
Operating principle



The control mechanism is a stainless ball stem valve (1), operated by a control stem (2). The flow rate is manually and properly set by use of the convenient onboard flow meter (3) housed in a bypass circuit on the valve body. This circuit is automatically shut off during normal operation. The flow rate is indicated by a metal ball (4)sliding inside a transparent channel (5) with an integral graduated scale (6).

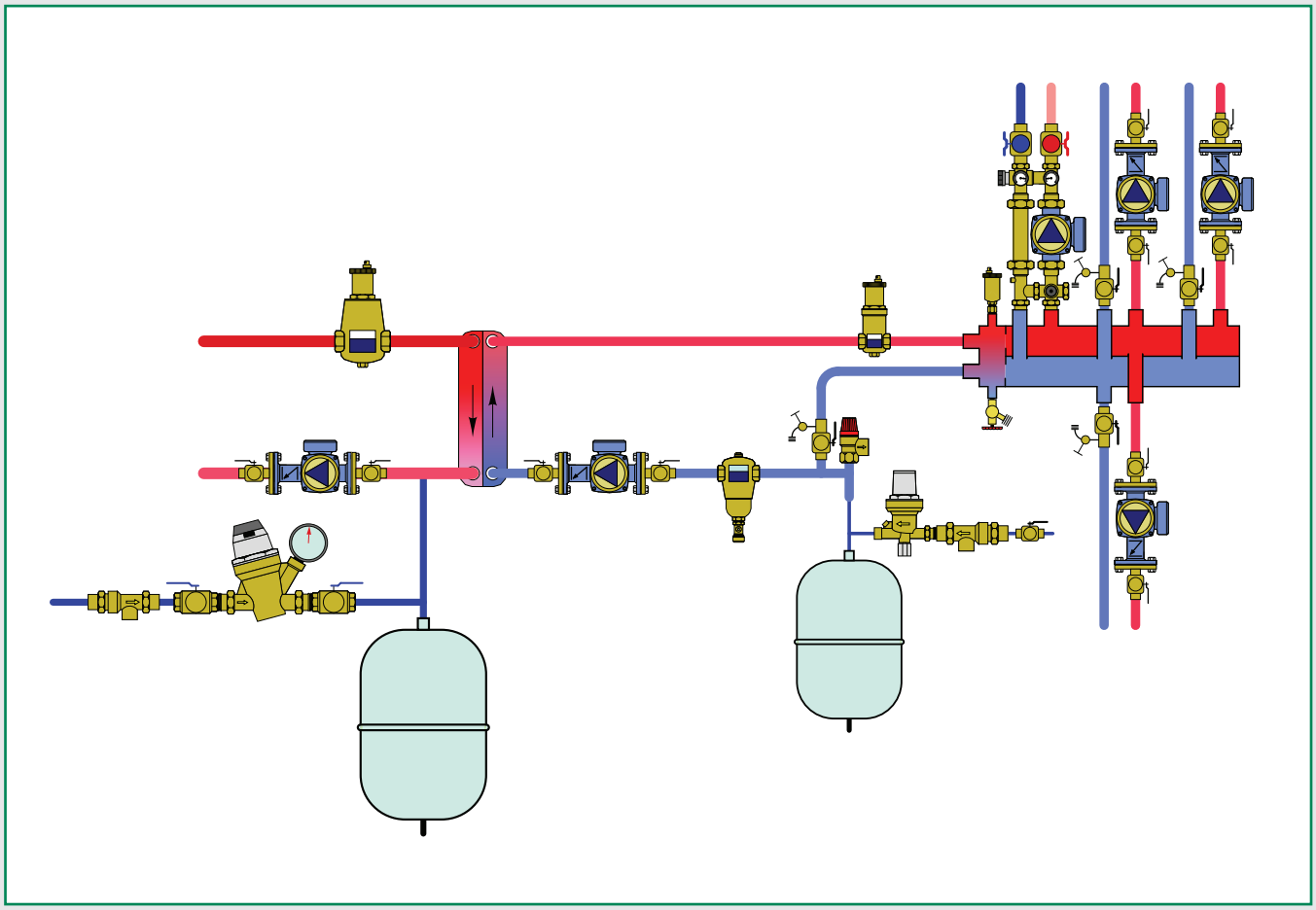


Balanced example



AUTOMATIC FILLING UNITS AND BACKFLOW PREVENTERS

This diagram is an example



Water treatment filling units, HYDROFILL™

Fill and flush cart, HYDROFLUSH™

Automatic filling units, AutoFill™

Backflow preventers

Boiler trim kits

WATER TREATMENT FILLING UNITS

Function

HYDROFILL™ is a water treatment filling unit that produces from site sourced water, demineralized water of an ideal grade for use in closed hydronic heating and cooling systems. Salts and other soluble minerals are almost entirely eliminated so as to prevent premature equipment malfunction including reduced efficiency or component failure due to lime scale formation, a common affliction of heat exchangers. The treated water results in low electrical conductivity to minimize corrosion due to galvanic attack. Also, by eliminating the variability of site produced water having different mineral content values from location to location, using treated water makes for more reliable dosing when chemical additives are used – such as glycol.

Site water flows up through a column of mixed bed resin beads which are charged with negative and positive ions. The effectiveness of removing minerals from site water through exchange depends on the TDS of input site water and the time the water has in contact with the resin beads. The column height of resin and the water flow rate will determine the effectiveness of the ion exchange, the slower the flow rate the higher the efficiency.

Water treatment capacity

Water classification	Hardness (ppm)	NA570912 (gallons)	NA570924 (gallons)
Slightly hard	< 60	1,750	3,500
Moderately hard	61 - 120	1,375	2,750
Hard	121 - 180	1,000	2,000
Very hard	181 - 250	475	950
Extremely Hard	> 250	250	500

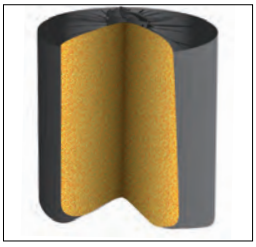
Capacities based on treating water containing 180 ppm (10.5 gpg) total dissolved solids (expressed as calcium carbonate), consisting of 25% sodium, 50% alkalinity, 77°F (25°C), at a flow rate of 6 gpm, delivering 30 ppm of treated water

Construction details

Large yellow lever enables quick and easy opening of the tank. Lever includes a pressure release valve. In one motion as the lid is turned to the full open position, the tank depressurizes and opens to the full diameter of the tank.

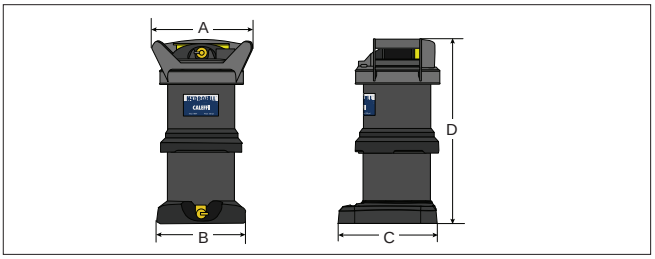
Highly accurate built-in TDS meter 0 - 999 ppm with resolution of 1 ppm due to its advanced microprocessor technology. Auto-Off function conserves battery power. The unit shuts off automatically after 10 minutes of non-use. Replaceable battery with a life of approximately 1000 hours of continuous use.

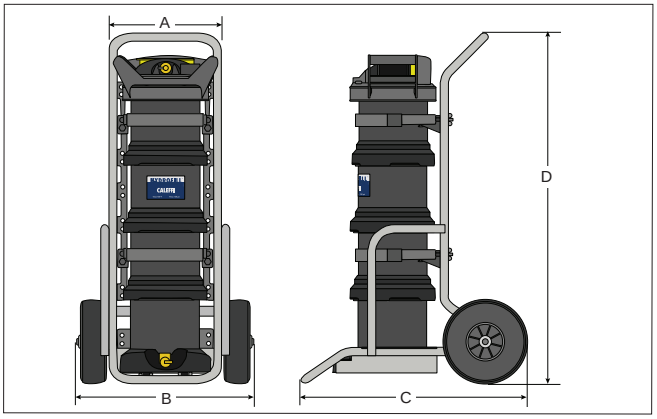
Pre-packed resin bags save time and simplify resin change process. No more time-consuming, inconvenient filling up of narrow tanks and no more spilled, wasted resin. Resin change process is simple as removing the used bags and inserting new ones. Each bag is made from a water permeable material and contains a pre-proportioned amount of high capacity premium grade virgin mixed bed resin.



Innovative flow distribution screen design evenly distributes the inlet water through the entire column of resin. Produces up to 30% more treated water from a single resin refill compared to other types of demineralization tanks. Reduced operational cost through less frequent resin replacement. Less waste, less time spent on changing resin.

Dimensions





Code	A	B	C	D	Wgt. Lbs.
NA570912	13"	11"	12"	22"	44
NA570924	13½"	21"	27"	42½"	98

WATER TREATMENT FILLING UNITS

NA570 HYDROFILL™

tech. broch. 01247

Portable water treatment filling unit, demineralizes site water through a mixed bed resin ion exchange with TDS indicator.
Complete including resin bags.
Composite PPHAGF50 body.
Max. inlet pressure: 120 psi.
Max. working temperature: 100°F.
Max. fill rate NA570912: 6 gpm.
Max. fill rate NA579024: 12 gpm.
TDS of water after treatment: < 30 ppm
Connections: ¾" GHT

Code	Description	Lbs	USD
NA570912	Two resin filter bag unit	44	**3,000.00**
NA570924	Four resin filter bag unit with cart	98	**5,700.00**

Recyclable resin bags for HYDROFILL™ in reusable plastic pail.

Code	Description	Lbs	USD
NA570971	Two resin bags for NA570912	22	**618.00**
NA570974	Four resin bags for NA570924	43	**1,235.00**

NA575

tech. broch. 01247

Multi-parameter TDS, pH & temperature tester kit complete with carrying case plus pH and conductivity calibration packets.
Range TDS: 0 —999.9 ppm.
Range pH: 0 — 14.
Range temp: 32 — 122°F.

Code	Description	Lbs	USD
NA575002	TDS, pH & temperature tester kit	3.0	**745.00**

NA573

tech. broch. 01247

Replenishment water treatment filling unit, demineralizes site water through a color changing (indicates when to change) demineralizing cartridge.
Complete including back flow preventer, isolation valves, filter housing with resin cartridge and AutoFill™.
Max. inlet pressure: 125 psi.
Max. working temperature: 100°F.
Max. flow: 1 gpm.
TDS of water after treatment: < 30 ppm
Connections: ½" NPT

Code	Description	Lbs	USD
NA573022	½" F NPT inlet x ½" F NPT outlet	7.4	**540.00**
NA573102	10" color changing demineralizing filter	1.0	**125.00**

NA573

tech. broch. 01247

Filter housing complete including color changing resin (indicates when to change) demineralizing cartridge.
Max. inlet pressure: 125 psi.
Max. working temperature: 100°F.
Max. flow: 1 gpm.
TDS of water after treatment: < 30 ppm
Connections: ½" NPT

Code	Description	Lbs	USD
NA573100	½" F NPT inlet x ½" F NPT outlet	3.4	**245.00**
NA573102	10" color changing demineralizing filter	1.0	**125.00**

NA256

Dual fill and flush valve.

(Select union fitting on page 88)

Code	Description	Pk	Lbs	USD
NA256011	1" male union thread x ¾" GHT	1	0.8	**210.00**

NA255 HYDROFLUSH™

tech. broch. 01280

HYDROFUSH pump cart is portable, leak-tested unit for a easy, quick and clean way to wash, flush and fill hydronic systems.
Medium: water, glycol and cleaning fluids.
Tank: 13 gallon with dirt filter.
Max. tank medium temperature: 150°F.
Pump delivery flow: 1—13 gpm
Pump feet of head: 220
Max. pump pressure: 100 psi.
Pump power: ½ HP (120 V AC).
Isolating ball valves: ¾" garden hose thread.
Transfer hoses: 6' with ¾" GHT (2 ea).
Pressure gauge: 2" dial, 0—100 psi.
Dimensions: 48"H × 20"W × 18"D.

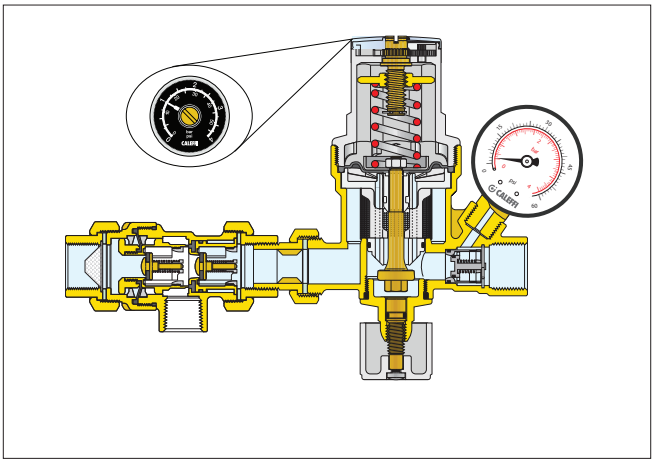
Code	Description	Lbs	USD
NA25510	Wash, flush and fill cart	60	**2,772.00**

AUTOMATIC FILLING UNITS

Function

The AutoFill™ Combo is a pre-assembled unit consisting of an AutoFill™ and backflow preventer.

The AutoFill™ automatic filling valve is a pressure reducing valve with a compensating seat, an inlet filter, a shut-off valve and a check valve. It is installed on the water inlet piping in sealed heating systems, and its main function is to maintain the pressure of the system to a preset value, automatically filling up with water as required. This valve has been designed as pre-adjustable, which means it can be adjusted at the required pressure value before charging the system. After installation, during the filling or topping-off phase, the water feed will stop automatically when the set pressure is reached filling 50% faster than other valves. There are no levers to flip or valve to close. Pre-assembled with the backflow preventer, it features an atmospheric vent which is designed to protect drinking water systems from return flow, caused by back-siphoning or back pressure, of contaminated fluids. The 573 series has been specifically certified to standards CSA B64.3 and ASSE 1012.



BACKFLOW PREVENTERS

573

tech. broch. 01061

Dual check continuous pressure backflow preventer with atmospheric vent.
Low Lead brass body.
Max. working pressure: 175 psi.
Working temperature range: 32—210°F.
Emergency backpressure temperature: 250°F
Certified to: ASSE 1012, CSA B64.3, NSF 372, Low Lead Laws and listed by ICC-ES.
Meets codes IPC, IRC & UPC for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1012

Code	Description	Lbs	USD
573403A	½" NPT female inlet/outlet	1.7	**121.30**
573409A	½" sweat inlet/outlet	1.7	**115.60**
573493A	½" sweat inlet x ½" F NPT outlet	1.7	**118.60**
573503A	¾" NPT female inlet/outlet	1.7	**127.40**

553 AutoFill™

tech. broch. 01061

Pre-adjustable automatic filling valve, anti-scale, visual system pressure indicator.
Complete with manual shut-off valve, strainer and check valve.
Brass body.
Max. inlet pressure: 230 psi.
Max. working temperature: 150°F.
Setting pressure range: 3—60 psi.
Preset outlet pressure: 15 psi.
Pressure gauge scale: 0—60 psi / 0-4 bar.

Code	Description	Lbs	USD
553542A	½" M NPT inlet x ½" F NPT outlet	1.7	**155.50**
553549A	½" sweat inlet x ½" F NPT outlet	1.7	**148.20**
553642A	½" M NPT inlet x ½" F NPT outlet / gauge	1.7	**175.50**
553649A	½" sweat inlet x ½" F NPT outlet / gauge	1.7	**168.20**

573 AutoFill™ Combo

tech. broch. 01061

Pre-adjustable automatic filling valve with backflow preventer.
Brass body.
Max. inlet pressure: 175 psi.
Max. working temperature: 150°F.
Setting pressure range: 3—60 psi.
Preset outlet pressure: 15 psi.
Pressure gauge scale: 0—60 psi / 0-4 bar.

ASSE 1012

Code	Description	Lbs	USD
573002A	½" F NPT inlet x ½" F NPT outlet	5.0	**266.90**
573009A	½" sweat inlet x ½" F NPT outlet	5.0	**254.20**
573012A	½" F NPT inlet x ½" F NPT outlet / gauge	5.0	**286.90**
573019A	½" sweat inlet x ½" F NPT outlet / gauge	5.0	**274.20**

Code	Description	Lbs	USD
NA10363	Replacement gauge 0-60 psi/0-4 bar, ¼" NPT	0.1	**20.00**

Code	Description	Lbs	USD
F59650	AutoFill™ 553 series replacement cartridge	0.2	**45.90**

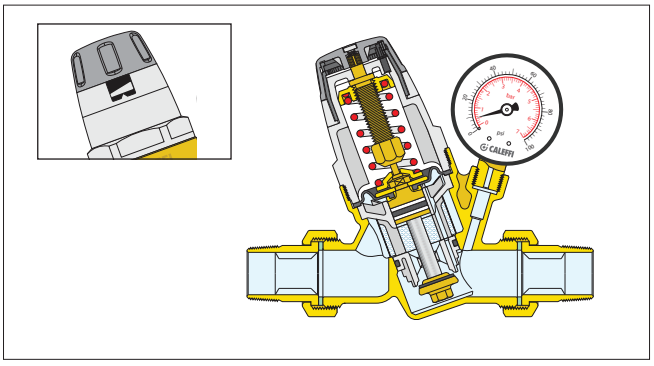
Code	Description	Lbs	USD
NA10197	AutoFill™ clear plastic disc cover	0.1	**2.10**

COMMERCIAL AUTOMATIC FILLING UNITS

5350 AutoFill™

tech. broch. 01085

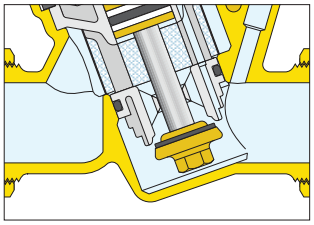
Automatic filling valve.
Brass body.
Complete with integral downstream pressure gauge and pressure setting adjustment knob.
Max. working pressure: 365 psi.
Max. working temperature: 140°F.
Pressure gauge scale: 0—100 psi /0-7 bar.
Pressure setting range: 6—90 psi.
Preset outlet pressure: 15 psi.



Code	Description	Lbs	USD
535051A	¾" NPT male union	2.3	**201.30**
535056A	¾" press	2.3	**207.00**
535059A	¾" sweat union	2.3	**199.00**
535066A	1" press	2.4	**224.50**

System pressure setting
AutoFill™ automatic filling valves in the 5350 series are fitted with an operating adjustment knob and an integral downstream outlet pressure gauge. This adjustment knob features continuous rotational operation, the pressure can be adjusted continuously, resulting in 7 psi per revolution, with the value displayed on the outlet gauge.

Removable self-contained cartridge
The cartridge, containing the diaphragm, strainer, seat, shuttle and compensating piston, is preassembled as a "self-contained unit" with a cover and can be easily removed for inspection and maintenance procedures.



High flow fast filling feature
AutoFill™ automatic filling valve 5350 series has large internal fluid passages allowing high flow filling with minimum pressure drop through the valve body. The table below shows flow rates with the corresponding pressure drop at different flow velocities.

Velocity **(f/s)**	4	6	8	10
Flow **(gpm)**	8	14	20	24
Pressure drop **(psi)**	8	13	17	21

NA102

Pressure gauge fits 5350 series AutoFill™.
Dial size: 2".
Pressure range: 0—100 psi /0-7 bar.
Connection: ⅛" NPT.

Code	Description	Lbs	USD
NA10273	⅛" NPT	0.1	**16.20**

Replacement cartridge for 5350 series AutoFill™.

Code	Description	Lbs	USD
535004	AutoFill™ 5350 series replacement cartridge	0.1	**73.50**

BOILER TRIM KITS

NA553

Boiler Trim Kits.
Boiler installation components in one box.
This kit includes:
- 1 Air purger
- 1 MiniCal® air vent with service check
- 1 Backflow preventer
- 1 AutoFill™
- 1 Expansion tank check valve
- 2 Brass nipples
- 1 Brass tee
- 1 Expansion tank

Code	**NA553**362P	**NA553**372P
Air purger	443-1 1" NPT F	444-1 1¼" NPT F
AutoFill™/Backflow preventer combination	573009A ½" sweat	573009A ½" sweat
MiniCal® Air vent w/ check	502115A	502115A
Check valve	561402A	561402A
Tank	4.4 gal	4.4 gal
Nipples	3" Brass	3" Brass
Tee	NPT Brass	NPT Brass
Weight (lbs)	15	16
USD	**$ 486.70**	**$ 486.70**

BOILER TRIM KITS

NA553

Boiler Trim Kits.
10 configurations combining 8 boiler installation components in one box.
This kit includes:

- 1 Caleffi DISCAL® Air Separator
- 1 Backflow Preventer
- 1 AutoFill™
- 1 Expansion Tank Check Valve
- 2 Brass Nipples
- 1 Brass Tee
- 1 Expansion Tank

NA553-B kits do not include backflow preventer

NPT Connections

Code	**NA553**252	**NA553**362	**NA553**662	**NA553**372	**NA553**672
DISCAL®	551003A ¾" NPT	551006A 1" NPT	551006A 1" NPT	551007A 1¼"NPT	551007A 1¼"NPT
AutoFill™/Backflow Preventer Combination	573002A ½" NPT	573002A ½" NPT	573002A ½" NPT	573002A ½" NPT	573002A ½" NPT
Check Valve	561402A	561402A	561402A	561402A	561402A
Tank	2.2 gal	4.4 gal	7.6 gal	4.4 gal	7.6 gal
Nipples	3" Brass	3" Brass	3" Brass	3" Brass	3" Brass
Tee	NPT Brass	NPT Brass	NPT Brass	NPT Brass	NPT Brass
Weight (lbs)	13	15	20	16	21
USD	**$ 609.00**	**$ 745.00**	**$ 865.00**	**$ 862.00**	**$ 984.00**

Sweat Connections

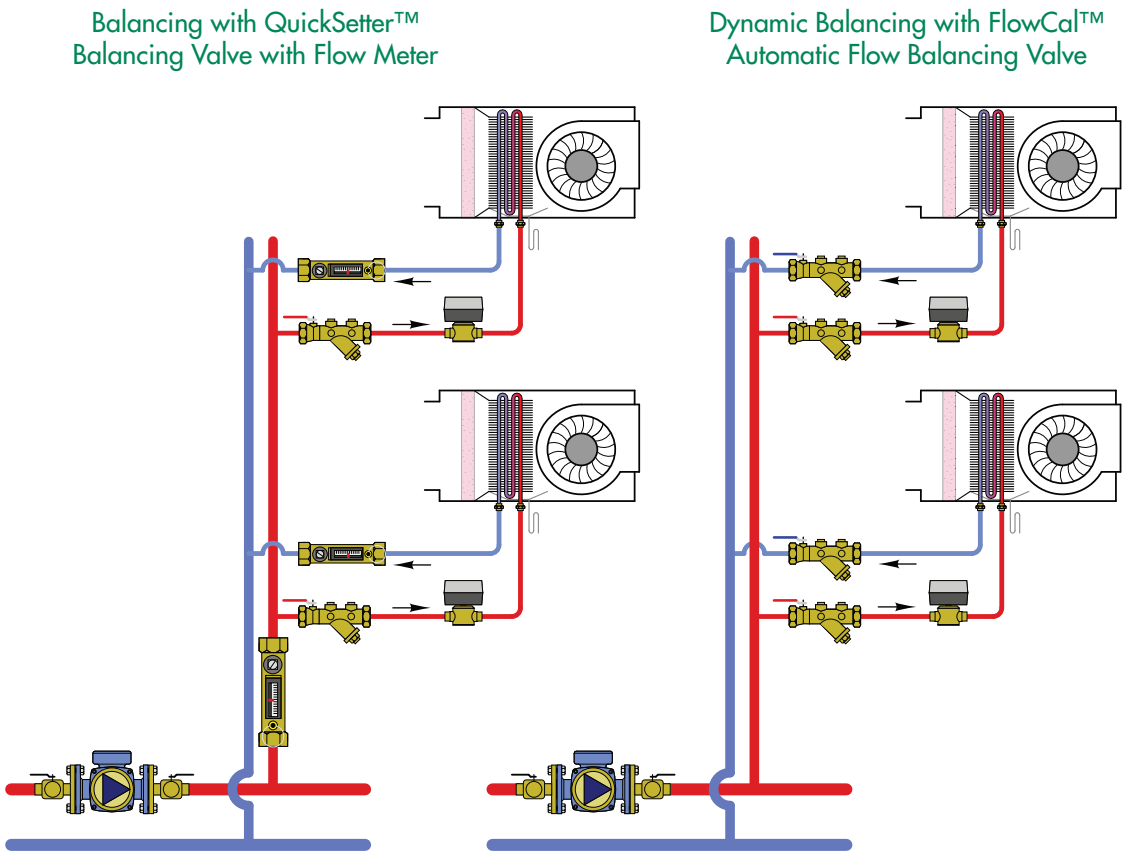
Code	**NA553**259	**NA553**369	**NA553**669	**NA553**379	**NA553**679
DISCAL®	551022A ¾" sweat	551028A 1" sweat	551028A 1" sweat	551035A 1¼" sweat	551035A 1¼" sweat
AutoFill™/Backflow Preventer Combination	573009A ½" sweat	573009A ½" sweat	573009A ½" sweat	573009A ½" sweat	573009A ½" sweat
Check Valve	561402A	561402A	561402A	561402A	561402A
Tank	2.2 gal	4.4 gal	7.6 gal	4.4 gal	7.6 gal
Nipples	3" Brass	3" Brass	3" Brass	3" Brass	3" Brass
Tee	NPT Brass	NPT Brass	NPT Brass	NPT Brass	NPT Brass
Weight (lbs)	13	15	20	16	21
USD	**$ 597.40**	**$ 730.00**	**$ 848.00**	**$ 846.00**	**$ 965.00**

Sweat Connections

Code	**NA553**259-B	**NA553**369-B	**NA5536**69-B	**NA553**379-B	**NA553**679-B
DISCAL®	551022A ¾" sweat	551028A 1" sweat	551028A 1" sweat	551035A 1¼" sweat	551035A 1¼" sweat
AutoFill™	553549A ½" sweat	553549A ½" sweat	553549A ½" sweat	553549A ½" sweat	553549A ½" sweat
Check Valve	561402A	561402A	561402A	561402A	561402A
Tank	2.2 gal	4.4 gal	7.6 gal	4.4 gal	7.6 gal
Nipples	3" Brass	3" Brass	3" Brass	3" Brass	3" Brass
Tee	NPT Brass	NPT Brass	NPT Brass	NPT Brass	NPT Brass
Weight (lbs)	12	13	18	15	20
USD	**$ 461.10**	**$ 592.00**	**$ 712.00**	**$ 710.00**	**$ 827.00**

BALANCING DEVICES

This diagram is an example



Low lead compact dynamic balancing valve, FlowCal™

Dynamic balancing valve, FlowCal™

Low lead fixed orifice static balancing valves

Low lead variable orifice static balancing valves

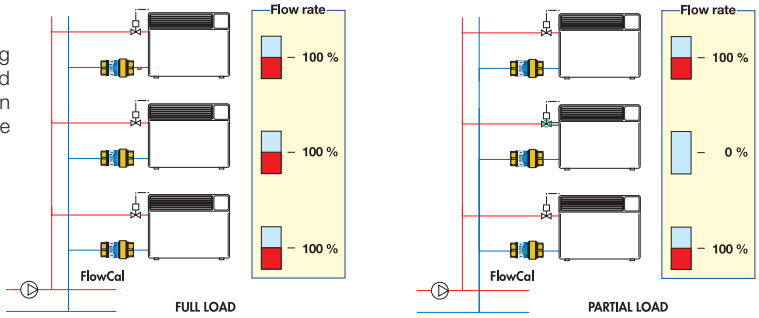
Static balancing valve with flow meter, QuickSetter™ and Low lead QuickSetter+™

Y-Strainer

DYNAMIC BALANCING—FlowCal™ DEVICES

Circuits balanced with FlowCal™

FlowCal™ balances the hydraulic circuit by automatically controlling the design flow rate to each emitter. Even with some circuits closed by the control valves, the flow rates in the open circuits remain constant at the nominal value. The system always provides the greatest comfort and the highest energy savings.

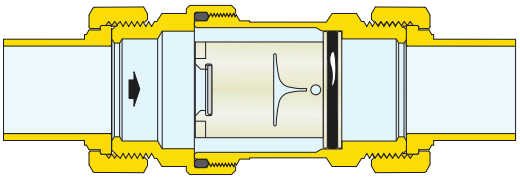


LOW LEAD COMPACT DYNAMIC BALANCING VALVE

127 FlowCal™

tech. broch. 01166

Compact automatic flow balancing valve.
DZR low-lead brass body.
Patented anti-scale, low noise polymer FlowCal™ cartridge.
Max. working pressure: 232 psi (16 bar).
Temperature range: 32—212°F (0—100°C).
Max. percentage of glycol: 50%
Differential pressure control ranges: 2–14, 2–32, 4–34, 5–35 psid.
Flow rate: 16 fixed flow rate settings ranging from 0.5—10 GPM.
Flow accuracy: ±10%.
Meets requirements of ANSI/NSF 372-2011. Certified to Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.
US Patent 7,246,635 B2.



Code	Description	Lbs	USD
127341AF ●●●	½" NPT male	1.0	**133.80**
127346AF ●●●	½" Press	1.0	**148.00**
27349AF ●●●	½" sweat	0.8	**127.40**
127351AF ●●●	¾" NPT male	1.0	**139.90**
127356AF ●●●	¾" Press	1.0	**161.90**
127359AF ●●●	¾" sweat	0.8	**133.10**
127361AF ●●●	1" NPT male	1.2	**160.40**
127366AF ●●●	1" Press	1.3	**200.40**
127369AF ●●●	1" sweat	1.0	**152.80**

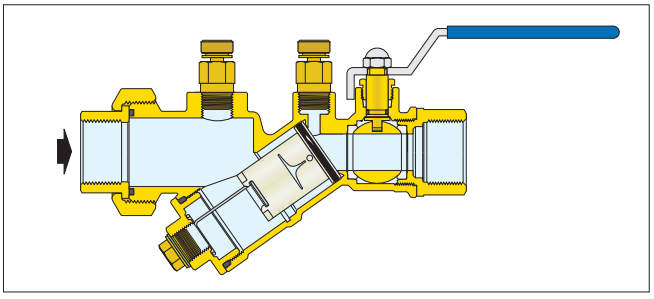
Select desired flow rate to complete full part number.
No restrictions.

GPM	Last 3 digits ...	Differential Pressure Control Ranges (psid)
½	G50	2—14
¾	G75	
1	1G0	2—32
1½	1G5	
2	2G0	
2½	2G5	
3	3G0	
3½	3G5	

GPM	Last 3 digits ...	Differential Pressure Control Ranges (psid)
4	4G0	2—32
4½	4G5	
5	5G0	
6	6G0	4—34
7	7G0	
8	8G0	
9	9G0	5—35
10	10G	

Replacement flow cartridge kits are available. Consult factory.

DYNAMIC BALANCING VALVE



121
FlowCal™

tech. broch. 01141

Automatic flow balancing valve with integral ball valve.
Brass body.
Patented anti-scale, low noise polymer FlowCal™ cartridge.
Maximum working pressure: 400 psi (400 WOG).
Working temperature range: 32—212°F (0—100°C).
Max. percentage of glycol: 50%.
Differential pressure control ranges: 2—14, 2—32, 4—34, 5—35 psid.
Flow rate: 27 fixed flow rate settings ranging from 0.5—21 GPM.
Flow accuracy: ±10%.
US Patent 7,246,635 B2.

Available with optional factory-installed pressure and temperature test ports (1213xxx series).

Code	Description	Lbs	USD
121141A ●●●	½" NPT female	2.7	**185.20**
121149A ●●●	½" sweat	2.7	**176.40**
121151A ●●●	¾" NPT female	2.7	**187.40**
121159A ●●●	¾" sweat	2.7	**178.50**
121161A ●●●	1" NPT female	5.0	**382.00**
121169A ●●●	1" sweat	5.0	**363.80**
121171A ●●●	1¼" NPT female	5.0	**428.40**
121179A ●●●	1¼" sweat	5.0	**407.90**
121341A ●●●	½" NPT female with PT test ports	3.2	**198.50**
121349A ●●●	½" sweat with PT test ports	3.2	**189.60**
121351A ●●●	¾" NPT female with PT test ports	3.2	**201.30**
121359A ●●●	¾" sweat with PT test ports	3.2	**191.70**
121361A ●●●	1" NPT female with PT test ports	5.5	**395.90**
121369A ●●●	1" sweat with PT test ports	5.5	**377.10**
121371A ●●●	1¼" NPT female with PT test ports	5.5	**442.30**
121379A ●●●	1¼" sweat with PT test ports	5.5	**421.20**

Select desired flow rate to complete full part number.

Size	GPM	Last 3 digits ...	Differential Pressure Control Ranges (psid)
½", ¾"	½	G50	2 — 14
½", ¾"	¾	G75	
½", ¾"	1	1G0	2 — 32
½", ¾"	1½	1G5	
½", ¾"	2	2G0	
½", ¾", 1"	2½	2G5	
½", ¾", 1"	3	3G0	
½", ¾", 1"	3½	3G5	
½", ¾", 1", 1¼"	4	4G0	
½", ¾", 1", 1¼"	4½	4G5	
½", ¾", 1", 1¼"	5	5G0	
½", ¾", 1", 1¼"	6	6G0	4 — 34
½", ¾", 1", 1¼"	7	7G0	
½", ¾", 1", 1¼"	8	8G0	

Size	GPM	Last 3 digits ...	Differential Pressure Control Ranges (psid)
½", ¾", 1", 1¼"	9	9G0	5 — 35
½", ¾", 1", 1¼"	10	10G	
1", 1¼"	11	11G	3 — 32
1", 1¼"	12	12G	
1", 1¼"	13	13G	
1", 1¼"	14	14G	4 — 35
1", 1¼"	15	15G	
1", 1¼"	16	16G	
1", 1¼"	17	17G	
1", 1¼"	18	18G	
1", 1¼"	19	19G	
1", 1¼"	20	20G	
1", 1¼"	21	21G	

Size	Flow Rates
½"	½—10 GPM
¾"	½—10 GPM
1"	2½—21 GPM
1¼"	4—21 GPM

Replacement flow cartridge kits are available. Consult factory.

LOW LEAD FIXED ORIFICE STATIC BALANCING VALVES

130 Fixed Orifice Balancing Valve

tech. broch. 01251

Fixed orifice.
Multi-turn adjustment range.
Memory stop feature.
Max. working pressure: 232 psi
Working temperature range: -4 to 250°F
Number of adjustment turns: 6
DZR Low-lead brass body.
Stainless steel valve plug.
Teflon® stem guide bearing.
Meets requirements of ANSI/NSF 372-2011.
Certified to Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

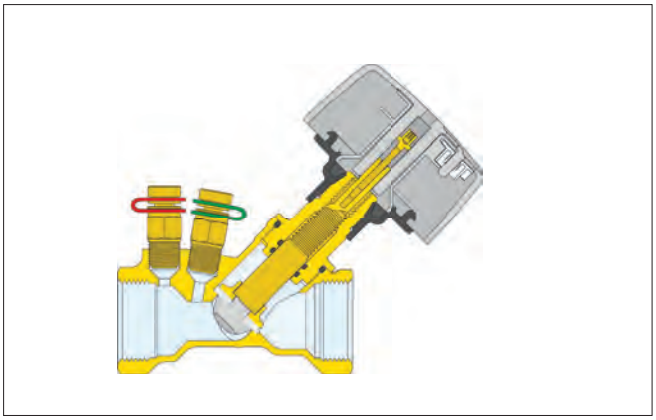
Code	Description	Max. valve Cv	Lbs	USD
130400A	½" NPT	3.7	1.0	**185.00**
130500A	¾" NPT	5.1	1.2	**200.00**
130600A	1" NPT	8.8	1.5	**240.00**
130700A	1¼" NPT	14.0	2.0	**300.00**
130800A	1½" NPT	19.7	2.3	**375.00**
130900A	2" NPT	30.5	2.5	**500.00**

Insulation shell fits 130 series balancing valves.

Code	Description	Lbs	USD
CBN130400A	fits ½" NPT	0.1	**40.70**
CBN130500A	fits ¾" NPT	0.1	**44.00**
CBN130600A	fits 1" NPT	0.1	**52.80**
CBN130700A	fits 1¼" NPT	0.1	**66.00**
CBN130800A	fits 1½" NPT	0.1	**82.50**
CBN130900A	fits 2" NPT	0.1	**110.00**

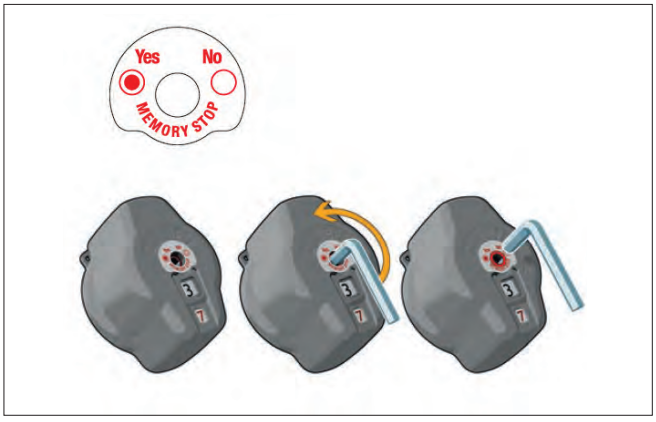
Operating principle

A balancing valve is a hydraulic device that regulates the flow rate of the fluid passing through it. The flow rate is regulated by means of a knob that controls the movement of a plug that allows the passage of the fluid. The flow rate is determined according to the Δp value measured by two pressure connectors located on the valve.



Venturi flow rate measurement device

The 130 series valves are equipped with a flow rate measurement device based on the Venturi effect. The device is incorporated in the body of the valve upstream of the valve plug.



Memory Stop

The 130 series balancing valve features a memory stop that allows the valve to be reopened to the initial position if it has been closed for any reason such as isolating components in the balanced circuit. Locking the position to be memorized requires the use of a 2.5 mm hex key.

VARIABLE ORIFICE STATIC BALANCING VALVE

142 Variable Orifice Balancing Valve

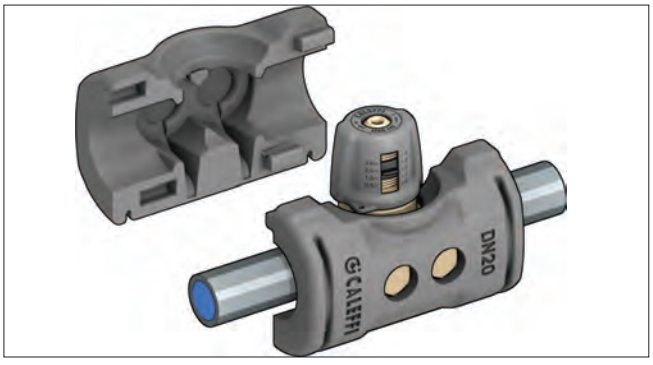
tech. broch. 01250

Memory stop feature
Characterized plug for smooth adjustment.
Maximum working pressure: 232 psi.
Working temperature range: 14—250°F.
DZR low-lead brass body.
Meets requirements of ANSI/NSF 372-2011.
Certified to Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

Code	Description	Cv	Lbs	USD
142241A	½" NPT	3.4	1.0	**155.00**
142251A	¾" NPT	5.0	1.2	**165.00**
142261A	1" NPT	7.5	1.5	**225.00**
142271A	1¼" NPT	12.9	2.3	**320.00**
142281A	1½" NPT	16.8	3.0	**360.00**
142291A	2" NPT	22.0	3.5	**460.00**

Insulation shell fits 142 series balancing valves.

Code	Description	Lbs	USD
CBN142241A	Fits ½"	0.1	**37.20**
CBN142251A	Fits ¾"	0.1	**39.60**
CBN142261A	Fits 1"	0.1	**54.00**
CBN142271A	Fits 1¼"	0.1	**76.80**
CBN142281A	Fits 1½"	0.1	**86.40**

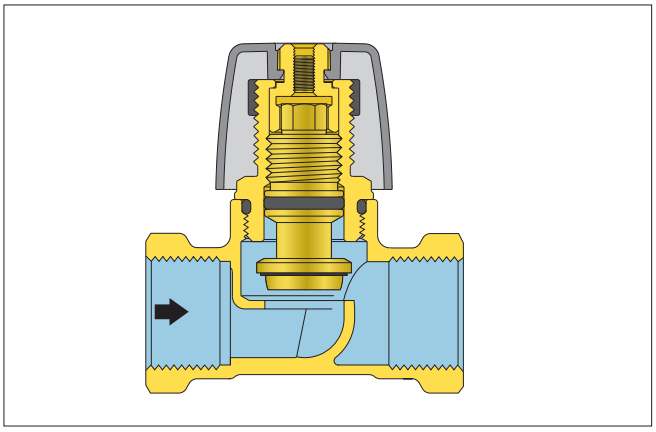


Operating Principle

The 142 is a variable orifice balancing valve for hydronic heating and cooling systems, plus low lead for plumbing circuits. Characterized flow plug which provides precise system balancing valves and highly accurate flow verses other setters with ball valve control.

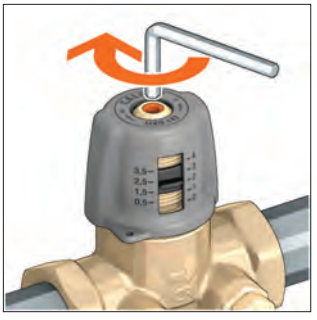
A compact body design with integral PT ports, a memory stop feature designed to accurately lock valve settings, with a hex key, enabling the valve to be closed and re-opened to the exact pre-set position which eliminates the need for rebalancing after servicing, heat and impact resistant glass-reinforced nylon adjustment knob, EPDM valve plug seal for accurate control and tight shut-off for isolation purposes.

The flow rate is determined according to the pressure drop valve measured by a differential pressure meter connected to the pressure test ports.



Memory Stop

Each 360 degree rotation of the adjustment knob moves the turn indicator by one position, ranging from 0 (valve closed) to 4 (valve fully open). After adjusting the flow rate, insert a 2.5 mm hex key in the hex hole, fully turn it clockwise without forcing it. This sets the valve's maximum stroke position. If necessary, it is possible to shutoff the balancing valve by turning the adjustment knob fully clockwise manually. To restore the valve to the pre-set position, turn the adjustment knob fully counter-clockwise.



STATIC BALANCING VALVE WITH FLOW METER

132 QuickSetter™

tech. broch. 01149

Balancing valve with flow meter.
Direct reading of flow rate.
No sight gauge clouding or scaling.
Brass valve body and flow meter.
Rotatable valve for flow rate adjustment.
Graduated scale flow meter with magnetic movement flow rate indicator.

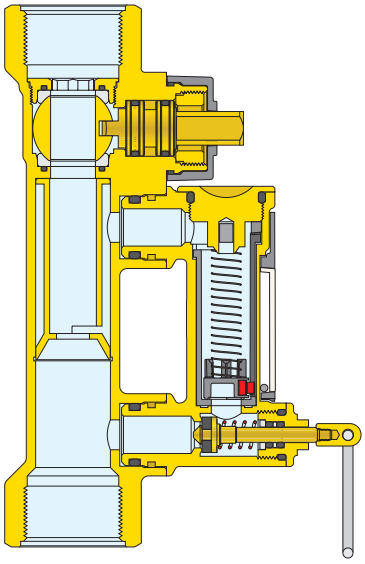
With insulation.
Max. working pressure: 150 psi.
Temperature range: 14—230°F.
Max. percentage of glycol: 50%.

Code	Description	Flow scale (gpm)	Lbs	USD
132432A	½" NPT	0.5—1.75	2.0	**260.70**
132552A	¾" NPT	2.0—7.0	1.8	**280.80**
132662A	1" NPT	3.0—10.0	2.4	**327.40**
132772A	1¼" NPT	5.0—19.0	2.8	**434.40**
132882A	1½" NPT	8.0—32.0	3.4	**514.60**
132992A	2" NPT	12.0—50.0	4.4	**631.40**
F19346	Replacement by-pass valve stem*		0.1	**51.20**

* With operating ring.

Construction details

In the QuickSetter™ series the flow rate (gpm) is displayed directly by a flow meter housed in a by-pass circuit on the valve body, which automatically is shut-off during normal operation.



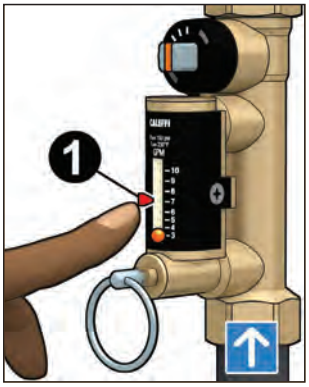
The flow meter permits fast and easy circuit balancing without need for differential pressure gauges and reference charts.

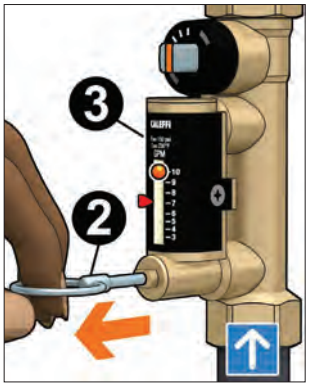
Flow rate adjustment

The flow rate is adjusted as follows:

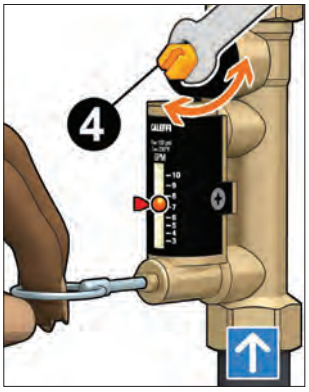
A. With the aid of the flow rate indicator (1), mark the desired flow rate.

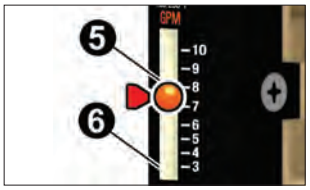
B. Use the operating ring (2) to open the by-pass valve slowly. This allows fluid to flow through the flow meter (3). The bypass valve is automatically closed under normal operating conditions.

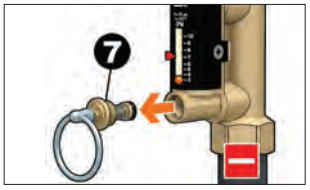




C. While holding the bypass valve open, use a wrench to turn the valve control stem (4) to adjust the flow rate slowly. The resulting flow rate is indicated by the metal ball (5) that slides up and down inside a transparent channel (6) marked by a graduated scale in gpm.





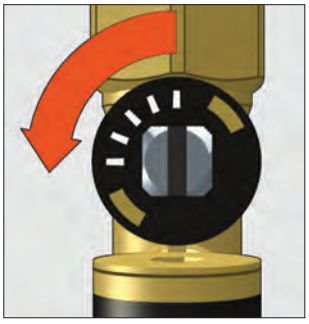


D. Once the flow rate is properly adjusted, release the operating ring (2) of the by-pass valve. The valve will automatically return to the closed position by means of an internal spring.

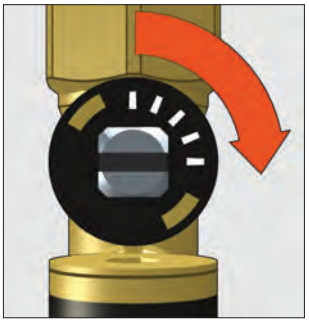
E. A replacement by-pass valve stem (7) with operating ring is available in event it is damaged and inoperable. Order code F19346.

Complete opening and closing of the valve

Full opening of the valve



Full closing of the valve



STATIC LOW-LEAD BALANCING VALVE WITH FLOW METER

132 QuickSetter+™

tech. broch. 01283

Balancing valve with flow meter.
Direct reading of flow rate.
No sight gauge clouding or scaling.
DZR low-lead brass.
Rotatable stainless steel flow rate adjuster.
Inlet flow check valve.
Graduated scale flow meter with magnetic movement flow rate indicator.
Meets requirements of ANSI/NSF 372-2011.
Certified to Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

Code	Description	Flow scale (gpm)	Lbs	USD
132439AFC	½" Sweat	0.5—1.75	2.0	**311.10**
132536AFC	¾" Press	0.5—1.75	1.8	**373.80**
132539AFC	¾" Sweat	0.5—1.75	1.8	**334.80**
132639AFC	1" Sweat	0.5—1.75	2.4	**386.30**
132459AFC	½" Sweat	2.0—7.0	2.0	**311.00**
132556AFC	¾" Press	2.0—7.0	1.8	**373.80**
132559AFC	¾" Sweat	2.0—7.0	1.8	**334.80**
132659AFC	1" Sweat	2.0—7.0	2.4	**386.30**

With temperature gauge:

Code	Description	Flow scale (gpm)	Lbs	USD
132438AFC	½" Sweat	0.5—1.75	2.4	**365.70**
132537AFC	¾" Press	0.5—1.75	2.2	**430.50**
132538AFC	¾" Sweat	0.5—1.75	2.2	**389.30**
132638AFC	1" Sweat	0.5—1.75	2.8	**439.80**
132458AFC	½" Sweat	2.0—7.0	2.4	**365.70**
132557AFC	¾" Press	2.0—7.0	2.2	**430.50**
132558AFC	¾" Sweat	2.0—7.0	2.2	**389.30**
132658AFC	1" Sweat	2.0—7.0	2.8	**439.80**
F19346	Replacement by-pass valve stem*		0.1	**51.20**

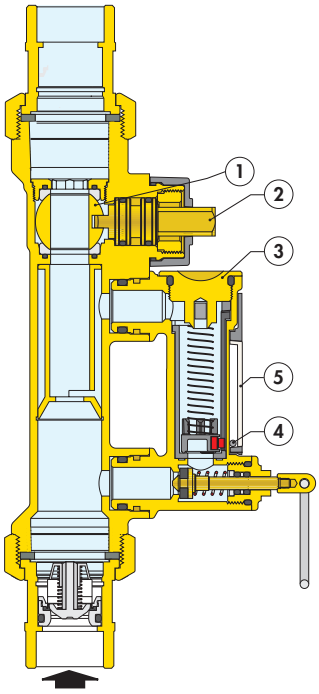
*with operating ring

Balancing made fast, easy, and accurate with QuickSetter+™

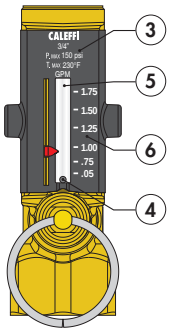
Features include:
- Three connection sizes: ½", ¾" and 1" sweat union
- Two flow range options: .5—1.75 gpm scale or 2—7 gpm scale
- Stainless steel flow adjuster
- Memory flow indicator
- Built-in flow check valve
- Temperature gauge (optional)

Connection	Flow rate (gpm)	Fully open Cv
1/2" sweat	0.5 - 1.75	1.0
3/4" sweat	0.5 - 1.75	1.0
1" sweat	0.5 - 1.75	1.0
1/2" sweat	2.0 - 7.0	6.3
3/4" sweat	2.0 - 7.0	6.3
1" sweat	2.0 - 7.0	6.3

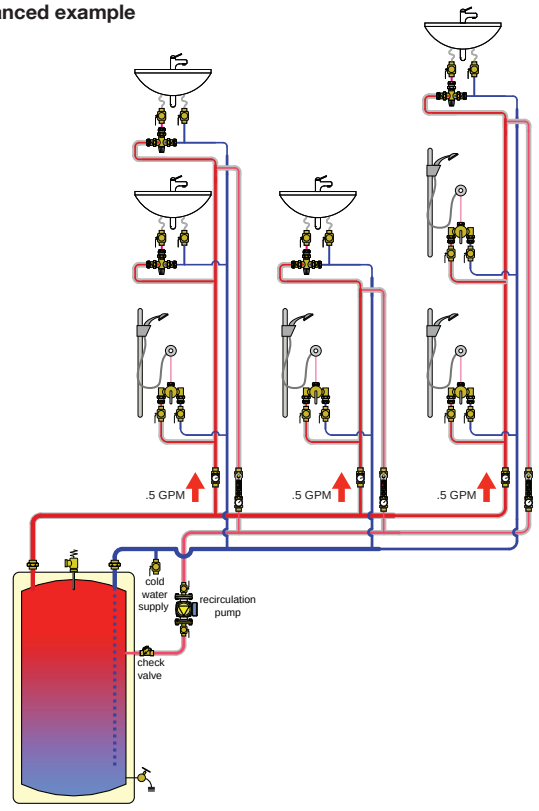
Operating principle



The control mechanism is a stainless ball stem valve (1), operated by a control stem (2). The flow rate is manually and properly set by use of the convenient onboard flow meter (3) housed in a bypass circuit on the valve body. This circuit is automatically shut off during normal operation. The flow rate is indicated by a metal ball (4)sliding inside a transparent channel (5) with an integral graduated scale (6).



Balanced example



STATIC BALANCING VALVE WITH FLOW METER

NA223

Direct in-line balancing / flow meter with brass body.
Max percentage of glycol: 50%.
Max working pressure: 150 psi.
Temperature range: 32—250°F.
Measuring accuracy: ±10%.
Cv: 6.0.

(Select fitting below)

Code	Description	Lbs	USD
NA223529	2 to 8 gpm with 1" union thread	0.9	**180.00**

Two union nuts, washers and tail pieces.
Union connection set fits 1" male threads.

Code	Description	Lbs	USD
NA12240	½" NPT with 1" union nuts	0.2	**42.80**
NA12249	½" sweat with 1" union nuts	0.2	**40.50**

Two union nuts, washers and tail pieces.
Union connection set fits 1" male threads.

Code	Description	Lbs	USD
NA12250	¾" NPT with 1" union nuts	0.2	**46.80**
NA12259	¾" sweat with 1" union nuts	0.2	**44.50**

Two union nuts, washers and tail pieces.
Union connection set fits 1" male threads.

Code	Description	Lbs	USD
NA12260	1" NPT with 1" union nuts	0.3	**56.90**
NA12269	1" sweat with 1" union nuts	0.3	**54.60**

100
PT test ports

Fast-plug pressure/temperature test ports fits FlowCal™ automatic flow balancing valves and the 120 series Y-strainer. The double-sealing core insures long and trouble free service.
Low Lead brass body.
Nordel Core.
Connections: ¼" NPT male.
Cap thread: ⅜"-24 UNF
Working temperature range: 0—275°F.
Max. working pressure: 435 psi.
Pair (2 ports included)

Code	Description	Lbs	USD
100001A	Standard size, 1½" length (pair)	0.5	**21.00**

538

Drain valves for field installation in blow-down-port connection of the 120 series Y-strainer.
Brass body.
With ¾" garden hose connection.
Max. working pressure: 150 psi.
Max: working temperature: 250°F.

Code	Description	Lbs	USD
538202 FD	¼" NPT fits ½—¾" 120 series	0.3	**19.00**
538402 FD	½" NPT fits 1—1¼" 120 series	0.3	**19.40**

Y-STRAINER WITH BALL VALVE

120
Y-strainer

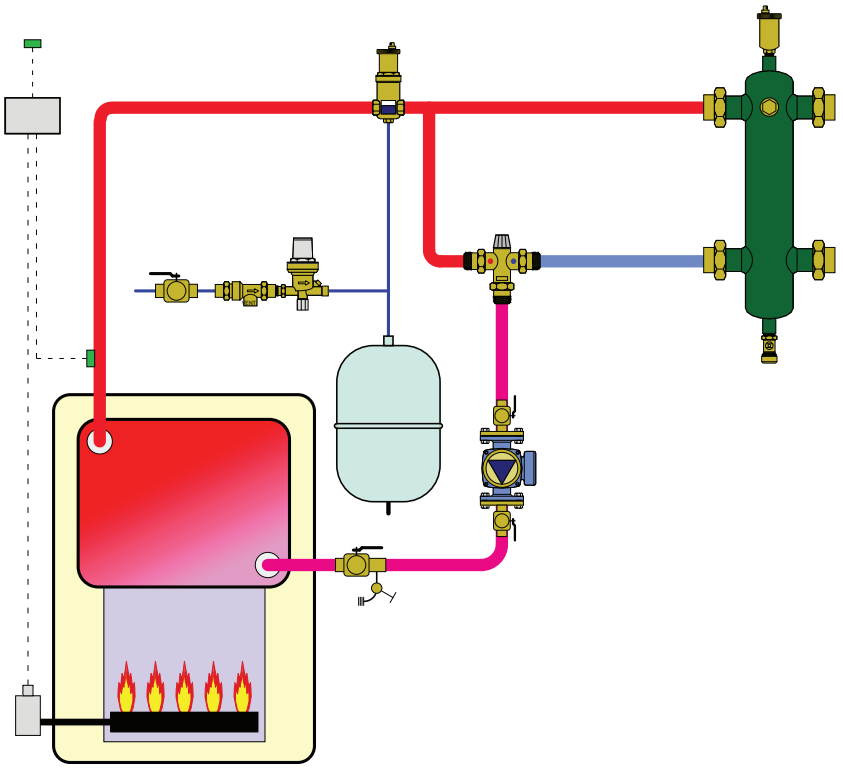
tech. broch. 01141

Y-strainer with integral ball valve. Brass body. Stainless steel strainer cartridge.
Maximum working pressure: 400 psi (400 WOG).
Working temperature range: 32—212°F.
Max. percentage glycol: 50%.
Strainer (20 mesh).
Connections: —body: F NPT union x F NPT, sweat union x sweat.
Pressure and temperature ports: ¼" NPT.
Drain port connection: ¼" for ½" & ¾" or ½" for 1" & 1¼".

Code	Description	Cv	Lbs	USD
120141A 000	½" NPT female	8.0	3.0	**167.90**
120149A 000	½" sweat	8.0	3.0	**159.90**
120151A 000	¾" NPT female	8.4	3.0	**170.10**
120159A 000	¾" sweat	8.4	3.0	**162.00**
120161A 000	1" NPT female	19	6.0	**335.80**
120169A 000	1" sweat	19	6.0	**319.70**
120171A 000	1¼" NPT female	20	6.0	**382.00**
120179A 000	1¼" sweat	20	6.0	**363.80**
120341A 000	½" NPT female with PT	8.0	3.5	**181.80**
120349A 000	½" sweat with PT	8.0	3.5	**173.10**
120351A 000	¾" NPT female with PT	8.4	3.5	**184.00**
120359A 000	¾" sweat with PT	8.4	3.5	**175.20**
120361A 000	1" NPT female with PT	19	6.5	**349.70**
120369A 000	1" sweat with PT	19	6.5	**333.00**
120371A 000	1¼" NPT female with PT	20	6.5	**396.00**
120379A 000	1¼" sweat with PT	20	6.5	**377.10**

FITTINGS

This diagram is an example



Fittings kits 9

Presscon™ fitting kits

Sweat union sets

In-line check valves

Mixing valve fittings

Zone valve fittings

AutoFill™ and backflow preventer fittings

Hydro separator fittings

Elbows, Tees and Crosses

FITTING KITS

Two union nuts, washers and tail pieces.
Low-lead brass.

Code	Description	Lbs	USD
NA12240	½" NPT with 1" union nuts	0.2	**42.80**
NA12249	½" sweat with 1" union nuts	0.2	**40.50**

Two union nuts, washers and tail pieces.
Low-lead brass.

Code	Description	Lbs	USD
NA12250	¾" NPT with 1" union nuts	0.2	**46.80**
NA12259	¾" sweat with 1" union nuts	0.2	**44.50**

Two union nuts, washers and tail pieces.
Low-lead brass.

Code	Description	Lbs	USD
NA12260	1" NPT with 1" union nuts	0.3	**56.90**
NA12269	1" sweat with 1" union nuts	0.3	**54.60**

Three union nuts, washers and tail pieces.
Low-lead brass.

Code	Description	Lbs	USD
NA12340	½" NPT with 1" union nuts	0.3	**64.30**
NA12349	½" sweat with 1" union nuts	0.3	**60.80**

Three union nuts, washers and tail pieces.
Low-lead brass.

Code	Description	Lbs	USD
NA12350	¾" NPT with 1" union nuts	0.3	**70.20**
NA12359	¾" sweat with 1" union nuts	0.3	**66.80**

Three union nuts, washers and tail pieces.
Low-lead brass.

Code	Description	Lbs	USD
NA12360	1" NPT with 1" union nuts	0.4	**85.40**
NA12369	1" sweat with 1" union nuts	0.4	**81.90**

PRESSCON™ FITTING KITS

Presscon™ copper press tail pieces with brass union nuts and washers. Low-lead.

Code	Description	Lbs	USD
NA12246	½" press with 1" union nut	0.2	**48.00**
NA12256	¾" press with 1" union nut	0.2	**52.50**
NA12266	1" press with 1" union slip nut	0.2	**70.00**

Presscon™ copper press tail pieces with 1" brass union nuts and washers. Low-lead.

Code	Description	Lbs	USD
NA12346	½" press with 1" union nut	0.3	**72.00**
NA12356	¾" press with 1" union nut	0.3	**78.75**
NA12366	1" press with 1" union slip nut	0.6	**105.00**

SWEAT UNIONS

Sweat union with 1" union thread nut.

Code	Description	Lbs	USD
NA12153	¾" sweat union	0.7	**50.70**

Sweat union with 1" union thread nut.

Code	Description	Lbs	USD
NA12154	1" sweat union	0.9	**55.80**

Sweat union with 1¼" union thread nut.

Code	Description	Lbs	USD
NA12155	1" sweat union	1.0	**79.40**

IN-LINE FLOW CHECK VALVES

In-line union sweat flow check valve.
Max percentage of glycol: 50%.
Max working pressure: 150 psi.
Temperature range: 32—250°F.
Opening pressure: 0.29 psi.

Code	Description	Cv	Lbs	USD
NA51059	¾" sweat union	12	0.7	**74.40**

In-line union sweat flow check valve.
Max percentage of glycol: 50%.
Max working pressure: 150 psi.
Temperature range: 32—250°F.
Opening pressure: 0.29 psi.

Code	Description	Cv	Lbs	USD
NA51069	1" sweat union	17	1.0	**95.00**

SMALL MIXING VALVE AND ZONE VALVE FITTINGS

Tail piece with check valve.
Low lead brass.

Code	Description	Lbs	USD
59893A	½" NPT male fits 1" nut	0.2	**34.80**
59840A	¾" NPT male for 1" nut	0.3	**39.50**

Tail piece without check valve.
Low lead brass.

Code	Description	Lbs	USD
R31981	½" NPT male fits 1" nut	0.4	**13.90**
31901A	¾" NPT male fits 1" nut	0.4	**15.60**

Tail piece.
Low lead brass. Requires sealing washer R50055, not included.

Code	Description	Lbs	USD
59817A	1" NPT male with 1" nut	0.2	**26.90**
59894A	1" NPT male with 1" nut w/check valve	0.4	**64.80**

Tail piece with check valve.
Low lead brass.

Code	Description	Lbs	USD
59904A	½" sweat fits 1" nut	0.2	**32.40**
59905A	¾" sweat fits 1" nut	0.3	**38.20**

Presscon™ copper press tail piece with 1" brass union nut. Low lead. Requires sealing washer, not included.

Code	Description	Lbs	USD
NA16264	½" press with 1" union slip nut	0.1	**24.00**
NA16265	¾" press with 1" union nut	0.1	**26.25**
NA16266	1" press with 1" union slip nut	0.2	**35.00**

Presscon™ long copper press tail piece with 1" brass union slip nut. Low lead. Requires sealing washer, not included.

Code	Description	Lbs	USD
NA16265L	¾" long press with 1" union slip nut	0.3	**55.00**
NA16265LC	¾" long press with 1" union nut/check valve	0.3	**69.80**

Presscon™ copper press low lead tail piece, requires R11217 1" slip nut.

Code	Description	Lbs	USD
NA10403	½" press fits 1" nut	0.1	**28.20**
NA10419	¾" press long fits 1" slip nut R11217	0.3	**51.50**
NA10404	1" press fits 1" slip nut R11217	0.4	**43.10**

Tail piece.
Low lead brass.

Code	Description	Lbs	USD
NA10002	½" sweat fits 1" nut	0.3	**12.50**
NA10003	¾" sweat fits 1" nut	0.4	**14.50**

Tail piece.
Low lead brass. Requires sealing washer R50055, not included.

Code	Description	Lbs	USD
59834A	1" sweat with 1" nut	0.4	**25.20**
59906A	1" sweat with 1" nut w/check valve	0.5	**62.50**

Tail piece with high temperature check valve.
Low lead brass.

Code	Description	Lbs	USD
NA10164	½" sweat fits 1" nut	0.2	**32.40**
NA10165	¾" sweat fits 1" nut	0.3	**38.20**

Tail piece with high temperature check valve.
Low lead brass. Requires sealing washer R50055, not included.

Code	Description	Lbs	USD
NA10166	1" sweat with 1" nut w/check valve	0.4	**62.50**

Presscon™ copper press low lead tail piece with check valve, requires R11217 1" slip nut.

Code	Description	Lbs	USD
NA10419C	¾" press long fits 1" slip nut w/check	0.3	**55.70**

Union nut fits 5213, 521 & 2521 series.
Low lead brass.

Code	Description	Lbs	USD
F61008	1" brass nut	0.2	**5.70**
F61008/C	1" chrome-plated nut	0.2	**6.80**
R11217	1" brass slip nut	0.2	**7.90**

Washer fits 5213, 521 & 2521 series.
(Priced each, sold in package of 10 each)

Code	Description	Lbs	USD
F50055	1" union washer	0.1	**2.10**

Washer fits 5213, 521 & 2521 series.
High temperature silicone rubber.
Working temperature: -40—350°F
(Priced each, sold in package of 10 each)

Code	Description	Lbs	USD
NA10302	1" union washer high temp silicone	0.1	**3.20**

5231 SERIES MIXING VALVE FITTINGS

Tail piece, all connections.
Low lead brass.
Use with 1½" union nut.

Code	Description	Lbs	USD
31554 FD	1" sweat, fits 523168A	0.3	**45.20**
41787 CST	1¼" sweat, fits 523177 & 523178A	0.3	**52.50**

Tail piece, all connections.
Low lead brass.
Use with 2½" union nut.

Code	Description	Lbs	USD
41788 CST	1½" sweat, fits 523188A	0.3	**70.40**
41789 CST	2" sweat, fits 523198A	0.5	**91.40**

Tail piece, all connections.
Low lead brass.
Use with 1½" union nut.

Code	Description	Lbs	USD
NA10009	1" NPT male, fits 523160A	0.2	**57.00**
R41660	1¼" NPT male, fits 523170A	0.3	**65.20**

Tail piece, all connections.
Low lead brass.
Use with 2½" union nut.

Code	Description	Lbs	USD
41371A	1½" NPT male, fits 523180A	0.2	**73.50**
41372A	2" NPT male, fits 523190A	0.2	**94.50**

Washer fits 523160A, 68A,70A, 77A, 78A.
Use with 1½" union nut.

Code	Description	Lbs	USD
R50057	1½" union washer	0.1	**4.40**

Washer fits 523180A, 88A, 90A, 98A.
Use with 2½" union nut.

Code	Description	Lbs	USD
R50060	2½" union washer	0.1	**21.10**

Union nut fits 523160A, 68A,70A, 77A, 78A.

Code	Description	Lbs	USD
R31589	1½" union nut	0.4	**19.50**

Union nut fits 523180A, 88A, 90A, 98A.

Code	Description	Lbs	USD
R51838	2½" union nut	0.5	**47.30**

AUTOFILL™ FITTINGS

AutoFill™ union nut.

Code	Description	Lbs	USD
F41186	¾" union nut	0.1	**4.50**

AutoFill™ tail piece.

Code	Description	Lbs	USD
NA10001	½" sweat	0.3	**12.50**

AutoFill™ tail piece.

Code	Description	Lbs	USD
F31868	½" NPT M	0.1	**15.10**

AutoFill™ washer.
(Priced each, sold in package of 10 each)

Code	Description	Lbs	USD
R50058	¾" union washer	0.1	**1.80**

BACKFLOW PREVENTER FITTINGS

Tail piece with screen fits 573 backflow preventer.

Code	Description	Lbs	USD
31970A	½" NPT female	0.1	**18.00**

Tail piece with screen fits 573 backflow preventer.

Code	Description	Lbs	USD
41380A	½" sweat female	0.1	**18.00**

Washer union fits 573 backflow preventer.

Code	Description	Lbs	USD
R50065	Union washer	0.1	**4.30**

HYDRO SEPARATOR FITTINGS

Tail piece.

Code	Description	Lbs	USD
31553 FD	1" NPT female, fits 548006A	0.3	**22.50**
31401 FD	1¼" NPT female, fits 548007A	0.3	**50.90**
R41441	1½" NPT female, fits 548008A	0.3	**49.20**
31426 FD	2" NPT female, fits 548009A	0.4	**100.60**

Tail piece.

Code	Description	Lbs	USD
31554 FD	1" sweat, fits 548096A	0.3	**45.20**
31403 FD	1¼" sweat, fits 548097A	0.3	**84.00**
41882A	1½" sweat, fits 54898A	0.3	**79.40**
31428 FD	2" sweat, fits 548099A	0.4	**130.10**

Presscon™ press tail piece.

Code	Description	Lbs	USD
NA10406	1" press, fits 548066A, 549566A	0.6	**58.30**
NA10407	1¼" press, fits 548067A, 549567A	0.7	**87.50**
NA10408	1½" press, fits 548068A, 549568A	0.9	**123.00**
NA10409	2" press, fits 548069A, 549569A	1.0	**200.00**

Union nut.

Code	Description	Lbs	USD
R31589	Fits 548006A and 548096A	0.4	**19.50**
R53003	Fits 548007A and 548097A	0.4	**38.60**
R53004	Fits 548008A and 548098A	0.4	**38.60**
R53005	Fits 548009A and 548099A	0.4	**44.10**

Union washer.

Code	Description	Lbs	USD
R50005	Fits 1" 548006A and 549096A	0.2	**4.30**
R50008	Fits 1¼" 548007A and 548097A	0.2	**9.00**
R50047	Fits 1½" 548008A and 548098A	0.2	**17.90**
R50048	Fits 2" 548009A and 548099A	0.2	**21.80**

FITTINGS WITH ¾" THREADS

Double nipple.

Code	Description	Lbs	USD
NA12122	¾" x ¾" male	0.3	**27.30**

Double nipple.

Code	Description	Lbs	USD
NA12172	¾" NPT x ¾" NPT	0.3	**27.30**

Union nut.

Code	Description	Lbs	USD
F41186	¾" union nut	0.1	**4.50**

Sweat adapter.

Code	Description	Lbs	USD
NA10118	¾" sweat x ¾" male thread	0.3	**27.30**

Nipple.

Code	Description	Lbs	USD
NA12152	¾" male w/ O-ring x ¾"male thread	0.3	**29.20**

FITTINGS WITH 1" THREADS

Double nipple.

Code	Description	Lbs	USD
NA12123	1" x 1" male thread	0.4	**34.10**

Double nipple.

Code	Description	Lbs	USD
NA12173	1" NPT x 1" NPT	0.4	**34.10**

Bushing.

Code	Description	Lbs	USD
NA10060	¾" NPT female w/ 1" male thread	0.3	**27.30**

Sweat adapter.

Code	Description	Lbs	USD
NA10061	¾" sweat adaptor w/ 1 " male thd.	0.2	**28.50**

Sweat adapter.

Code	Description	Lbs	USD
NA10062	1" sweat adaptor w/ 1" male thd.	0.1	**29.50**

Double union connector
high temperature silicone O-ring
pre-installed inside union.

Code	Description	Lbs	USD
NA10272	1" female thread union	0.5	**52.50**

High temperature silicone O-ring,
replacement for NA10272.

Code	Description	Lbs	USD
NA10271	Red silicone o-ring	0.1	**4.20**

FITTINGS WITH 1" THREADS

Nipple.

Code	Description	Lbs	USD
NA10064	1" NPT w/ 1" male thread	0.2	**30.70**

Nipple.

Code	Description	Lbs	USD
NA12162	¾" male w/ O-ring x 1" male thread	0.2	**31.60**

Bushing.

Code	Description	Lbs	USD
NA10089	¾" female thread x 1" male thread	0.1	**22.70**

Plug.

Code	Description	Lbs	USD
NA10083	1" male threaded plug	0.2	**17.00**

Disk.

Code	Description	Lbs	USD
NA10104	1" disk	0.1	**4.50**

Cap

Code	Description	Lbs	USD
586600	1" female thread cap	0.2	**15.40**

High temperature silicone flat 1" washer

Code	Description	Lbs	USD
NA10302	1" flat silicone gasket	0.1	**3.20**

FITTINGS WITH 1¼" THREADS

Double nipple.

Code	Description	Lbs	USD
NA12124	1¼" x 1¼" thread	0.4	**54.60**

Sweat adapter.

Code	Description	Lbs	USD
NA10119	1" sweat adapter x 1¼" union thread	0.4	**37.50**

Bushing.

Code	Description	Lbs	USD
NA10087	1" female x 1¼" male thd. bushing	0.4	**27.50**

Bushing.

Code	Description	Lbs	USD
61215A	1" NPT F x 1¼" M thd. bushing	0.8	**27.30**

Nipple.

Code	Description	Lbs	USD
R31706	1" male x 1¼" male nipple	0.3	**34.10**

Plug.

Code	Description	Lbs	USD
NA10236	1¼" male threaded plug	0.1	**21.40**

Disk.

Code	Description	Lbs	USD
R11059	1¼" female disk	0.1	**5.70**

FITTINGS

(NAL6263 shown)

Brass fittings, elbows.
Male (M) straight thread.
Female (F) straight thread.
Female (F) union nut.
22mm female compression.

Code	Description	Lbs	USD
NAL5263	¾" M thread x 1" F union nut	0.4	**69.80**
NAL5736	¾" F thread x 22mm comp.	0.4	**53.00**
NAL6262	1" M thread x 1" M thread	0.4	**39.50**
NAL6263	1" M thread x 1" F union nut	0.4	**51.70**
NAL6273	1" M thread x 1¼" F union nut	0.4	**84.30**
NAL6363	1" F union nut x 1" F union nut	0.4	**63.80**
NAL7262	1¼" M thread x 1" M thread	0.4	**67.00**
NAL7263	1¼" M thread x 1" F union nut	0.4	**79.20**
NAL7273	1¼" M thread x 1¼" F union nut	0.4	**111.80**

(NAC6TT26341 shown)

Brass fittings, cross.
Male (M) straight thread (thd).
Female (F) straight thread (thd).
Female (F) union nut.
NPT (F) Female.
22mm female compression.
Sweat (F).

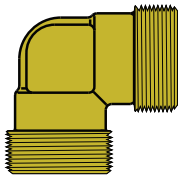
Code	Description	Lbs	USD
NAC41TT5454	½" NPT F x T. well x ¾" Sweat x ¾" Swt	2.0	**176.50**
NAC41626236	½" NPT F x 1" M x 1" M x 22mm comp.	2.0	**126.50**
NAC623641TT	1" M x 22mm x ½" NPT F x T. well	2.0	**165.20**
NAC6262TT41	1" M x 1" M x T. well x ½ NPT F	2.0	**142.50**
NAC6263TT41	1" M x 1" F nut x T. well x ½" NPT F	2.0	**154.70**
NAC62TT6241	1" M x T. well 1" M x ½" NPT F	2.0	**142.50**
NAC62TT6341	1" M x T. well x 1" F nut x ½" NPT F	2.0	**154.70**
NAC72TT6241	1¼" M x T. well x 1" M x ½" NPT F	2.0	**170.00**
NAC72TT7241	1¼" M x T. well x 1¼" M x ½" NPT F	2.0	**197.50**

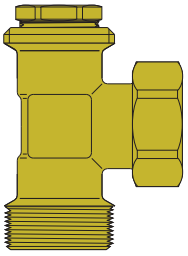
(NAT634162 shown)

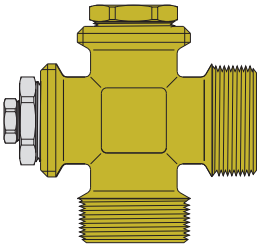
Brass fittings, Tees.
Male (M) straight thread (thd).
Female (F) straight thread (thd).
Female (F) union nut.
NPT (F) Female.
22mm female compression.
Sweat (F)

Code	Description	Lbs	USD
NAT417272	½" NPT F x 1¼" M thd x 1¼" M thd	0.6	**111.20**
NAT523641	¾" M thd x 22mm comp. x ½" NPT F	0.6	**90.50**
NAT524136	¾" M thd x ½" NPT F x 22mm comp.	0.6	**90.50**
NAT545641	¾" Sweat x ¾" comp. x ½" NPT F	0.6	**77.00**
NAT574136	¾" F thd x ½" NPT F x 22mm comp.	0.6	**61.30**
NAT623641	1" M thd x 22mm comp. x ½ NPT F	0.6	**70.50**
NAT624136	1" M thd x ½" NPT F x 22mm comp	0.6	**70.50**
NAT624162	1" M thd x ½" NPT F x 1" M thd	0.6	**47.80**
NAT626241	1" M thd x 1" M thd x ½" NPT F	0.6	**47.80**
NAT626262	1" M thd x 1" M thd x 1" M thd	0.6	**48.90**
NAT626341	1" M thd x 1" F union nut x ½" NPT F	0.6	**60.00**
NAT626362	1" M thd x 1" F union nut x 1" M thd	0.6	**61.10**
NAT6263TT	1" M thd x 1" F union nut x Temp well	0.6	**99.80**
NAT62TT63	1" M thd x Temp well x 1" F union nut	0.6	**99.80**
NAT634162	1" F union nut x ½" NPT F x 1" M thd	0.6	**60.00**
NAT636262	1" F union nut x 1" M thd x 1" M thd	0.6	**61.10**
NAT6362TT	1" F union nut x 1" M thd x Temp well	0.6	**99.80**
NAT724162	1¼" M thd x ½" NPT F x 1" M thd	0.6	**75.30**
NAT724164	1¼" M thd x ½" NPT F x 1" Sweat	0.6	**106.60**
NAT417264	½" NPT F x 1¼" M thd x 1" Sweat	0.6	**106.60**
NAT724172	1¼" M thd x ½" NPT F x 1¼" M thd	0.6	**111.20**
NAT72TT72	1¼" M thd x Temp well x 1¼" M thd	0.6	**159.00**

SPECIAL CONFIGURED FITTINGS







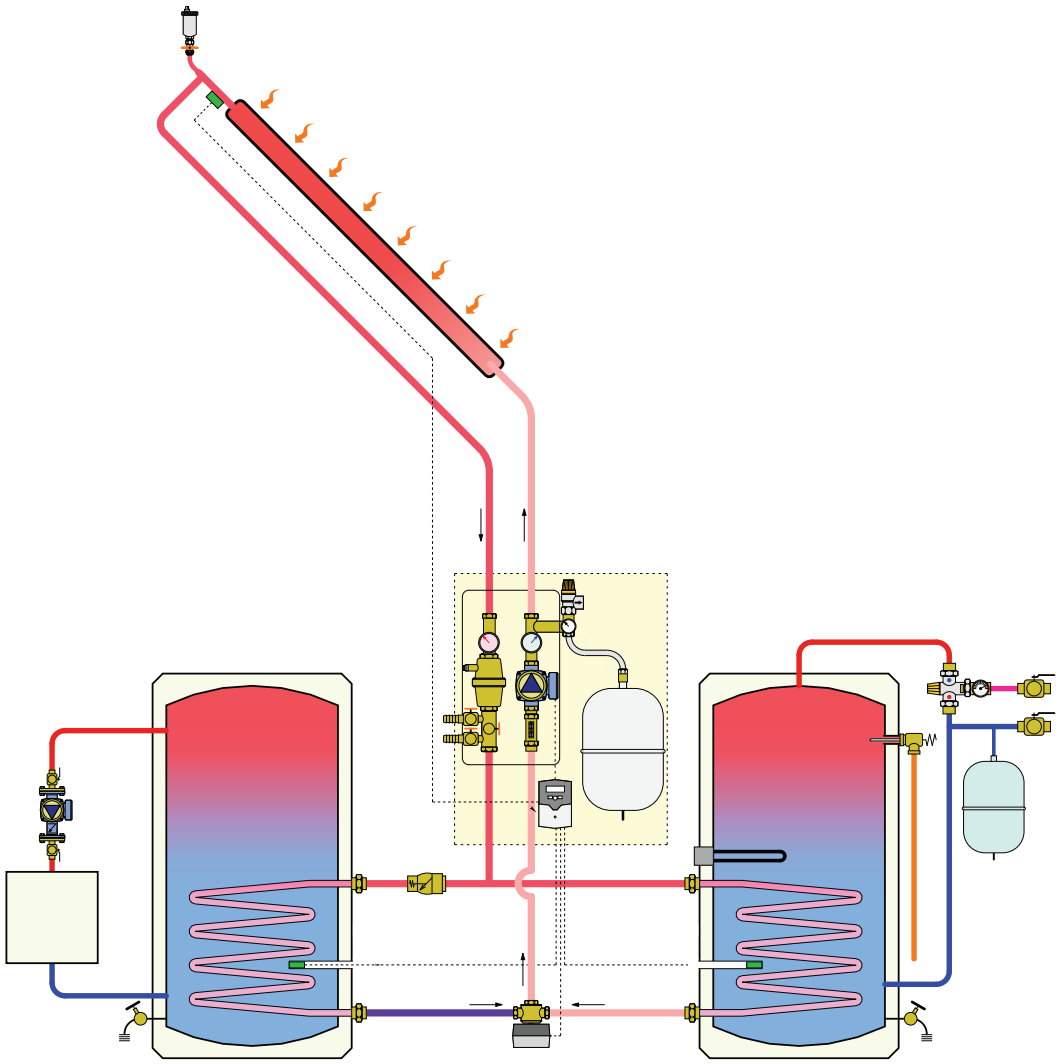
Brass fittings are configured by starting at 12:00 position and moving clockwise to 3:00 position followed by clockwise to 6:00 position ending with 9:00 position on cross. Special order any configuration of fitting by specifying connections type and size plus clock position.

Code	Description	Lbs	USD
NALXXXX	Special configured elbow	0.4	**CF***
NATXXXXXX	Special configured tee	0.6	**CF***
NACXXXXXXXX	Special configured cross	2.0	**CF***

*Consult factory.

SOLAR COMPONENTS

This diagram is an example



10A

- Solar collectors, StarMax 4™
- Complete solar water heaters
- Storage tanks, SolarCon™
- Expansion tanks
- Solar pump stations
- Drainback pump station
- DC solar pump
- In-line flow meter / balancing valves
- In-line check valves
- High temperature glycol
- Solar air vents and air separators
- Low lead mixing valves
- SolarFlex™ piping
- *iSolar*™ differential temp. controllers
- Flow meters
- *iSolar*™ data loggers

SOLAR COLLECTORS

NAS144
StarMax 4™

tech. broch. 01173

Star Max 4™ flat plate collectors heat fluid from solar energy for solar water heater and space heating systems.
Fluids: water, glycol solutions.
Maximum percentage of glycol: 60%.
Working pressure: 90 psi.
Max. test pressure: 150 psi.
Working temperature: -40—350ºF.
Typical transfer flow rate: 0.5—1.8 gpm.
Wind load rating: 180 mph.
Connection: 1"union NAS14406,
1¼" union NAS14408, NAS14410
SRCC Category C: 40 kBtu/day.
Approvals: SRCC OG-100.

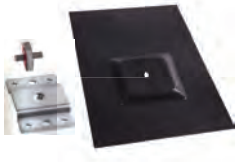
Code	Description	Lbs	USD
NAS14406	4' x 6.5', Category C 25 kBtu/day	90	**2,618.00**
NA10100	Crating charge for NAS14406 (1—10)	net	**100.00**
NAS14408	4' x 8', Category C 32 kBtu/day	113	**3,092.00**
NAS14410	4' x 10', Category C 40 kBtu/day	153	**3,444.00**
NA10126	Crating for NAS14408 / NAS14410 (1—6)	net	**100.00**

Flat plate collector mounting brackets and wide strut mount.

Code	Description	Lbs	USD
NAS10001	Universal foot mount, 4 each	5	**280.40**
NAS10004	Wide strut mount, 4 each	1	**168.00**

Aluminum 6005-T5 square tube extension for tilting flat plate collectors. Connects with tilt mounting U brackets.

Code	Description	Lbs	USD
NAS10002	1" square tube x 6'	2	**140.70**
NAS10005	1" square tube x 12'	4	**252.00**



Flashing kit with ⅜" stud for attaching U mounts and other brackets using the supplied ⅜" stainless steel nut & washer. Black painted aluminum 6061 T6 flashing 14¾"L x 9½"W x 0.6"H ,galvanized steel base plate with six mounting holes and double stud.

Code	Description	Lbs	USD
NAS10030	Flashing kit	1.5	**78.80**

Galvanized steel base plate with ⅜"-16 center thread and six mounting holes, can be used under a truss or rafter.

Code	Description	Lbs	USD
NAS10032	Steel base plate	0.5	**29.40**

High temperature silicone flat 1" gasket for drainback connections. Use with 586600 cap and sweat tail piece connections.

Code	Description	Lbs	USD
NA10302	1" flat silicone gasket	0.1	**3.20**

Includes washer (2), nut (2), disk (2) and plug (1).
For connecting odd or even number of 6.5' collectors.

Code	Description	Lbs	USD
NA12145	6.5' collector, odd or even number	2	**41.60**

Includes washer (3), washer (1), nut (2), disk (2), plug (1) and nipple (1).
For connecting even numbers of 8' and 10' collectors.

Code	Description	Lbs	USD
NA12146	8' & 10' collector, even number	3	**103.10**

Includes washer (3), nut (2), disk (2), plug (2) and thread, male (1).
For connecting odd numbers of 8' and 10' collectors.

Code	Description	Lbs	USD
NA12147	8' & 10' collector, odd number	3	**141.30**

COMPLETE SOLAR WATER HEATER SYSTEMS

NAS300

The prepackaged, specially engineered solar water heating system includes all of the components needed for a standard installation — from the solar collectors, to the pump station and controller, to pre-insulated piping, to the storage tank, and all of the necessary hardware and components.
System collector code numbers:
4' x 6.5' flat plate (NAS14406).
4' x 8' flat plate (NAS14408)
4' x 10' flat plate (NAS14410).
Approvals: SRCC OG-300 certified.

50 gal. single coil with electric element (NAS20053)

Code	Description	Collectors	Lbs.	USD
NAS30020-P	no collector		490	**8,596.00**
NAS30020	4' x 6.5' collector	1	590	**12,273.00**
NAS300201	4' x 6.5' collector	2	680	**15,051.00**
NAS30020P8	4' x 8' collector	1	615	**12,690.00**
NAS300201P8	4' x 8' collector	2	730	**15,983.00**
NAS30020P10	4' x 10' collector	1	655	**13,127.00**
NAS300201P10	4' x 10' collector	2	810	**16,857.00**

80 gal. single coil with electric element (NAS20083)

Code	Description	Collectors	Lbs.	USD
NAS30040-P	no collector		660	**9,907.00**
NAS30040	4' x 6.5' collector	2	760	**16,384.00**
NAS300401	4' x 6.5' collector	3	850	**19,306.00**
NAS30040P8	4' x 8' collector	2	785	**17,346.00**
NAS300401P8	4' x 8' collector	3	900	**20,710.00**
NAS300 40P10	4' x 10' collector	2	825	**18,220.00**
NAS300401P10	4' x 10' collector	3	980	**22,020.00**

80 gal. dual coil without electric element (NAS20082)

Code	Description	Collectors	Lbs.	USD
NAS30042-P	no collector		610	**10,453.00**
NAS30042	4' x 6.5' collector	2	810	**16,859.00**
NAS300421	4' x 6.5' collector	3	900	**19,852.00**
NAS30042P8	4' x 8' collector	2	835	**17,892.00**
NAS300421P8	4' x 8' collector	3	950	**21,256.00**
NAS30042P10	4' x 10' collector	2	875	**18,766.00**
NAS300421P10	4' x 10' collector	3	1030	**22,566.00**

120 gal. single coil with electric element (NAS20123)

Code	Description	Collectors	Lbs.	USD
NAS30060-P	no collector		670	**10,780.00**
NAS30060	4' x 6.5' collector	3	970	**20,087.00**
NAS300601	4' x 6.5' collector	4	1060	**23,071.00**
NAS30060P8	4' x 8' collector	3	995	**21,583.00**
NAS300601P8	4' x 8' collector	4	1110	**25,043.00**
NAS30060P10	4' x 10' collector	3	1035	**22,894.00**
NAS300601P10	4' x 10' collector	4	1190	**27,014.00**

120 gal. dual coil without electric element (NAS20122)

Code	Description	Collectors	Lbs.	USD
NAS30062-P	no collector		700	**11,326.00**
NAS30062	4' x 6.5' collector	3	1000	**20,562.00**
NAS300621	4' x 6.5' collector	4	1090	**23,617.00**
NAS30062P8	4' x 8' collector	3	1025	**22,129.00**
NAS300621P8	4' x 8' collector	4	1140	**25,589.00**
NAS30062P10	4' x 10' collector	3	1065	**23,440.00**
NAS300621P10	4' x 10' collector	4	1220	**27,560.00**

Key	Code	Description	
1	255060A	Dual-line solar pump station with ¾" SolarFlex™ fittings	
2	255007	Expansion tank mounting kit with double-check valve	
3*	259012	3 gallon	Tank size is system dependent
	259018	5 gallon	
	259025	7 gallon	
	259033	9 gallon	
4	NA267003	Bracket to mount solar pump station to storage tank	
5	257260A	*iSolar*™ Plus differential temperature controller	
6	NA15006	Lightning protector	
7	NA10092	18" SJ round cord connects pump to controller	
8	NA3540-15	SolarFlex™ ¾" x 50 ft. coil piping with fittings	
9	NA12133	Hangers fits ¾" SolarFlex™ (4 pcs)	
10	NA3140-02	Two ¾" flex pipes with insulation, 6' long	
11	NA10093	Two 90-degree brass elbows 1" male union half	
12	250041A	Automatic solar air vent, ½" NPT male	
13	NA29284	Solar air vent shut-off valve, ½" NPT MxF	
14	NAT624162	Tee 1" M union x ½" NPT F x 1" union nut	
15	NA35001	EPDM insulation black tape, 1/8" x 2" x 25' roll	
16	NA35002	UV-resistant black film tape, 2" x 30' roll	
17*	NA12145	Connection kit fits 6.5' collectors	
	NA12146	Connection kit fits even 8' and 10' collectors	
	NA12147	Connection kit fits odd 8' and 10' collectors	
18*	NAS10001	Universal foot mounts fits solar collectors	
19*	NA10103	5-15 gallons glycol. NSF listed (amount model specific)	

*these items are not provided in the "-P" kits (kit without collectors)

STORAGE TANKS

NAS200 SolarCon™

tech. broch. 01175

Storage tanks can serve as either a domestic hot water tank or a thermal buffering tank with porcelain glass coated steel lining. Powder-coated steel external cover. Drain port/valve.
Max. working pressure: 150 psi.
Working temperature: -40—190ºF.
Recommended max. delivery water temperature: 120ºF.
Testing pressure: 300 psi.
Tank insulation: 2" non-CFC foam.
Insulation thermal conductivity: R16.
Temperature & pressure relief valve: 210ºF/150 psi. (HX models)
Electric element: 4.5 Kw. UL listed.
Connections: 25 gal. no HX (6) 1½" NPT F top & side, (2) ¾" NPT F top & side.
Non HX (7) 2" NPT female side, (3) ¾" NPT female top.
50 gal. HX (2) 1" NPT male side, (2) ¾" NPT male on top.
80-119 gal. (1) HX (3) 1" NPT male side, (1) 1" NPT male top.
80-119 gal. (2) HX (5) 1" NPT male side, (1) 1" NPT male top.

*Reduction of Lead in Drinking Water Act Compliant: 0.25% max. weighted average lead content. Certified through Underwriters Laboratory (UL) in accordance with NSF/ANSI 372. Meets CSA C309.

Code	Description	Lbs	USD
NAS20025	25 gal. no HX	100	**2,657.00**
NAS20050	50 gal. no HX	200	**3,176.00**
NAS20053	50 gal. 1 HX , electric element	231	**4,043.00**
NAS20080	80 gal. no HX	250	**3,754.00**
NAS20083	80 gal. 1 HX, electric element	297	**5,486.00**
NAS20082	80 gal. 2 HX	327	**6,064.00**
NAS20120	119 gal. no HX	350	**4,967.00**
NAS20123	119 gal. 1 HX, electric element	397	**6,526.00**
NAS20122	119 gal. 2 HX	427	**7,161.00**
NAS20124	119 gal. 2 HX, electric element	429	**7,392.00**

Function

No HX:

Typical applications include where system design requires use of an external heat exchanger, an open solar thermal system, or when buffering storage capacity is required.

One HX:

A coil type solar loop HX is located in the lower portion of the tank. An electrical heating element provides boost heat for a one tank system, or is unused for a two tank pre-heat system.

Two HX:

Coil type HX's are located in the lower and upper portions of the tank. Common applications include using the upper HX for boost heat when connected to a back-up heat source, using the top HX for supplemental space heat, or connecting both HX's to the solar loop for layer loading.

Two HX with electrical element:

Typical application is for a one tank domestic hot water system with electric element boost, and utilizing upper HX for supplemental space heat.

STORAGE TANK ACCESSORIES

Reducer bushing fits tanks without HX for installing temperature probe.
Low lead brass
1 5/8" hex head.

Code	Description	Lbs	USD
NA10234	2" NPT male x ¾" NPT female	0.4	**79.80**

Male plug 1 1/4" square head.

Code	Description	Lbs	USD
NA10339	2" NPT male plug, stainless steel	0.2	**43.40**

Brass reducing bushing. 1 ⅛" hex head.

Code	Description	Lbs	USD
NA10082	¾" NPT male x ½" NPT female	0.3	**8.00**

Magnesium anode rod.

Code	Description	Lbs	USD
NA10229	¾" NPT x 36" anode rod fits 50 gal.	8.0	**64.10**
NA10230	¾" NPT x 40" anode fits 80 &120 gal.	9.0	**89.40**

90º brass elbow to connect ¾" SolarFlex™ to heat exchanger in SolarCon tank.

Code	Description	Lbs	USD
NA10093	1" NPT female x 1" male	0.5	**64.60**

Insulated 6' SolarFlex™ for connecting solar pump station to SolarCon™ HX.

Code	Description	Lbs	USD
NA3140-02	¾" SolarFlex with 1" union nuts	1	**194.30**

EXPANSION TANK

259

tech. broch. 01246

Solar system expansion tanks with ¾" straight thread.
System temp. range: 15—250°F.
Maximum diaphragm temp : 160°F.
Maximum working pressure: 150 psi.
Pre-charge pressure: 35 psi.
Maximum percentage of glycol: 50%.

Code	Description	Lbs	USD
259012	3 gallon, ¾" male straight thread	14	**171.90**
259018	5 gallon, ¾" male straight thread	17	**213.50**
259025	7 gallon, ¾" male straight thread	21	**276.40**
259033	9 gallon, ¾" male straight thread	24	**471.90**
259050	13 gallon, ¾" male straight thread	28	**595.00**

ACCESSORIES

255

tech. broch. 01246

Expansion tank connection kit.
Includes ¾" connection, wall bracket, hardware and double check valve.

Code	Description	Lbs	USD
255007	S.S. flexible tank connection kit	3.0	**200.00**

Expansion tank fitting connections. ¾" union nut connects to the expansion tank.

Code	Description	Lbs	USD
NA25540	½" NPT union connection set	0.1	**29.50**
NA25549	½" sweat union connection set	0.1	**27.20**

Cap for plugging tank connection on pump station while leak testing. Requires (R50058) washer.

Code	Description	Lbs	USD
R21180	¾" female cap	0.1	**6.30**

ACCESSORIES

NA255

6' flexible stainless steel extension for connecting expansion tank to pumping station.

Code	Description	Lbs	USD
NA255002	¾" union nuts	1	**110.30**

NA267

Kit for mounting solar pumping station onto storage tank and connecting expansion tank to pumping station. Includes bracket, hardware and 6' extension for expansion tank.

Code	Description	Lbs	USD
NA267002	¾" union nuts	2	**131.30**

NA267

Kit for mounting solar pumping station onto storage tank. Includes bracket and hardware.

Code	Description	Lbs	USD
NA267003	Kit to mount solar station	2	**24.20**

255

Hand pump attaches to solar pump station for pressurizing system.

Code	Description	Lbs	USD
255010A	Manual hand pump	3.0	**336.00**

NA256

Two solar station connection kits.

Code	Description	Lbs	USD
NA256012	¾" F x ¾" M thread and cap	1.0	**315.00**

SOLAR PUMP STATIONS

278 & 279

tech. broch. 01264

Solar pump stations are pre-assembled and leak-tested. Safety relief valve. Ball valves with built-in flow checks in return (and flow for dual-line models). Temperature gauges in return (and flow for dual-line models). Pressure gauge. Manual air vent (dual-line models only). Expansion tank connection. Connections for flushing and filling. Foam insulation.
Balance/flow meter: 1— 8 gpm scale.
Pump: three speed
Pump performance: 19 ft head/8 gpm.
Safety relief valve: 90 psi.
Max. working pressure: 145 psi.
Max. working temp: 350ºF.
Connections: ¾" female thread.
(Select adaptors to the right)

Code	Description	Lbs	USD
279051A	Dual-line solar pump station	17	**1,313.00**
279051	Dual-line solar station w/o pump	12	**1,050.00**
278751A	Single-line solar pump station	14	**1,145.00**
278751	Single-line solar station w/o pump	10	**882.00**
278011	Controller housing	0.5	**64.00**

Replacement pumps fits current solar pump stations 278 & 278, plus discontinued 255 & 256 stations.
3 speed 120 V
1" male union thread.
Agency approval: cULus.

(Install in-line with union fitting on page 88)

Code	Description	Lbs	USD
NA12170	Wilo Star S-16, 13' head / 8 gpm	5.0	**340.00**
NA12168	Wilo Star S-21, 19' head / 8 gpm	5.0	**340.00**

Temperature gauges fits 278 & 279 solar stations.

Code	Description	Lbs	USD
F29759	1½" red dial temp. gauge	0.1	**50.50**
F29758	1½" blue dial temp. gauge	0.1	**50.50**

PUMP STATION FITTINGS

½" SolarFlex™ directly to top or bottom.
2 each.

Code	Description	Lbs	USD
NA26640	¾" male thread x ¾ male thread	0.6	**58.40**

½" SolarFlex™ directly to top and bottom.
4 each.

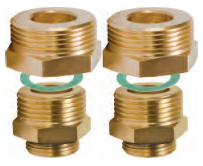
Code	Description	Lbs	USD
NA26740	¾" male thread x ¾" male thread	1.0	**116.80**

¾" SolarFlex™ directly to top or bottom.
2 each.

Code	Description	Lbs	USD
NA26650	¾" male thread x 1" male thread	0.6	**63.20**

¾" SolarFlex™ directly to top and bottom.
4 each.

Code	Description	Lbs	USD
NA26750	¾" male thread x 1" male thread	1.0	**126.40**



1" SolarFlex™ directly to top or bottom.
2 each.

Code	Description	Lbs	USD
NA26660	¾" male thread x 1¼" male thread	0.6	**122.40**

1" SolarFlex™ directly to top and bottom.
4 each.

Code	Description	Lbs	USD
NA26760	¾" male thread x 1¼" male thread	1.0	**244.90**

PUMP STATION FITTINGS

½" sweat fittings to top or bottom.
2 each.

Code	Description	Lbs	USD
NA26649	¾" male thread x ½" sweat fitting	0.6	**96.00**

½" sweat fittings to top and bottom. 4 each.

Code	Description	Lbs	USD
NA26749	¾" male thread x ½" sweat fitting	1.0	**191.90**

¾" sweat fittings to top or bottom.
2 each.

Code	Description	Lbs	USD
NA26659	¾" male thread x ¾" sweat fitting	0.6	**107.70**

¾" sweat fittings to top and bottom. 4 each.

Code	Description	Lbs	USD
NA26759	¾" male thread x ¾" sweat fitting	1.0	**215.50**

1" sweat fittings to top or bottom.
2 each.

Code	Description	Lbs	USD
NA26669	¾" male thread x 1" sweat fitting	0.6	**117.80**

1" sweat fittings to top and bottom. 4 each.

Code	Description	Lbs	USD
NA26769	¾" male thread x 1" sweat fitting	1.0	**235.60**

DRAINBACK PUMP STATION

278

tech. broch.01136

Drainback solar pump stations designed with a high head and steep pump curve which are pre-assembled and leak-tested.
Safety relief valve, ball valve, temperature gauge, pressure gauge, air fill valve.
Connections for flushing and filling with foam insulation.
Balance/flow meter: 1—8 gpm scale.
Pump: Grundfos UP15-100
Performance: 36 feet head / 8 gpm.
Safety relief valve: 90 psi.
Max. working pressure: 145 psi.
Max. working temp: 350ºF.
Connections: ¾" female thread.

(Select adaptors to the left)

Code	Description	Lbs	USD
278951A	Drainback solar pump station	14	**1,223.00**

NA121

Replacement single speed 120 V,
1" male union thread.
Flow 36 feet head / 8 gpm.
Agency approval: cULus.

(Install in-line with union fitting on page 88)

Code	Description	Lbs	USD
NA12171	Grundfos UP 15-100	6.0	**420.00**

DC SOLAR PUMP

NA267

8 to 34 VDC, DC Strong solar pump for mounting in solar stations.
15 feet head / 7 gpm at 24 VDC.
8 feet head / 4 gpm at 12 VDC.
Power consumption: 30—45 W.
Max. working pressure: 150 psi.
Max. temperature: -10—230°F.

Shown mounted in 279051 or can be mounted inside 278751.

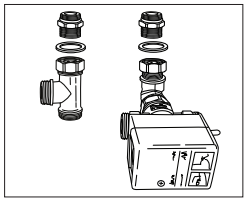
((Install in-line with union fitting on page 88)

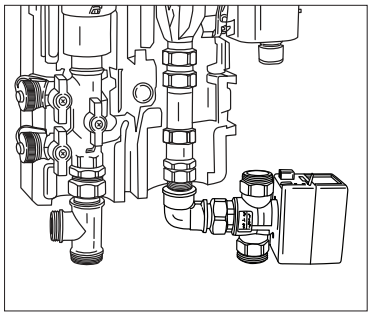
Code	Description	Lbs	USD
NA26711	1" male union thread	3.0	**685.00**

DIVERTING VALVE KIT

NA267

Diverting three-way valve for solar pump station mounting kit. Used for diverting solar fluid to another storage tank, swimming pool heat exchanger or heat dissipating device. (Select fittings below)





Kit Contents

Code	Description	Quantity
Z126000	Actuator 120 VAC	1
Z300687	Three-way valve with 1" male union threads	1
NAL6363	Elbow with 1" union threads	1
NAT636262	Tee with 1" union threads	1
NA10092	Power cord	1

Code	Description	Lbs	USD
NA26710	Diverting three-way valve kit	6.0	**336.00**

Select two fitting sets below, mix and match sets for a total of four union fittings.

NA122

Two union nuts, washers and tail pieces.
Union connection set fits 1" male threads.

Code	Description	Lbs	USD
NA12240	½" NPT with 1" union nuts	0.2	**42.80**
NA12249	½" sweat with 1" union nuts	0.2	**40.50**

Two union nuts, washers and tail pieces.
Union connection set fits 1" male threads.

Code	Description	Lbs	USD
NA12250	¾" NPT with 1" union nuts	0.2	**46.80**
NA12259	¾" sweat with 1" union nuts	0.2	**44.50**

Two union nuts, washers and tail pieces.
Union connection set fits 1" male threads.

Code	Description	Lbs	USD
NA12260	1" NPT with 1" union nuts	0.3	**56.90**
NA12269	1" sweat with 1" union nuts	0.3	**54.60**

IN-LINE CHECK VALVE

NA510

In-line union sweat solar flow check valve.
Open pressure: 0.29 psi.
Max percentage of glycol: 50%.
Max working pressure: 150 psi.
Temperature range: 32—250°F.
Open pressure: 0.29 psi

Code	Description	Cv	Lbs	USD
NA51059	¾" sweat union	12	0.7	**74.40**

NA510

In-line union sweat solar flow check valve.
Open pressure: 0.29 psi.
Max percentage of glycol: 50%.
Max working pressure: 150 psi.
Temperature range: 32—250°F.
Open pressure: 0.29 psi

Code	Description	Cv	Lbs	USD
NA51069	1" sweat union	17	1.0	**95.00**

BALANCING / FLOW METER

NA223

Direct in-line balancing / flow meter with brass body.
Max percentage of glycol: 50%.
Max working pressure: 150 psi.
Temperature range: 32—250°F.
Measuring accuracy: ±10%.
Cv: 6.

(Select fitting to the left)

Code	Description	Lbs	USD
NA223529	2 to 8 gpm with 1" union thread	0.9	**180.00**

FILL & FLUSH VALVE

NA256

Dual fill and flush valve.

(Select fitting to the left)

Code	Description	Pk	Lbs	USD
NA256011	1" male union thread x ¾" GHT	1	0.8	**210.00**

COMMERCIAL SOLAR PUMP STATION

NA255

The Solar pump station is pre-assembled and leak-tested unit without fittings for transferring heat from the collector to the storage tank. The pump station contains the following:
Ball valves in flow and return in combination with flow check valves.
Foam insulation shell.
Ports for filling and flushing.
Manual air vents.
Balance/flow meter.
Temperature gauges in flow and return.
Pressure gauge.
Safety relief valve: 90 psi.
Pump: Star S 30 U25 three-speed.
Connection: 1" male straight thread.
Max. working pressure: 150 psi.
Max. working temp: 360°F.
Adjustable flow: ½ to 10 gpm.
Agency approval: cULus.

(Select fittings to the right)

Code	Description	Lbs	USD
NA255160	1" male union thread	25	**2,180.00**

Replacement pump fits solar pump station NA255. 120 VAC / 1.3 A. 30 feet head / 30 gpm. 1½" male union thread.

Code	Description	Lbs	USD
NA12169	Wilo Star S 30	6.0	**540.00**

Replacement solar pump station pressure gauge.
Pressure range: 0—90 psi.
Dial size: 1 ½"

Code	Description	Lbs	USD
NA12156	¼" male rear connection thread	0.1	**48.80**

PUMP STATION FITTINGS

NA155

NA255160 Solar pump stations fitting kits. (mix & match for top & bottom)

Code	Description	Lbs	USD
NA15550	¾" NPT male union kit	1.0	**173.70**

NA255160 Solar pump stations fitting kits. (mix & match for top & bottom)

Code	Description	Lbs	USD
NA15559	¾" sweat union kit	1.0	**140.90**

NA255160 Solar pump stations fitting kits. (mix & match for top & bottom)

Code	Description	Lbs	USD
NA15560	1" NPT male union kit	1.1	**173.70**

NA255160 Solar pump stations fitting kits. (mix & match for top & bottom)

Code	Description	Lbs	USD
NA15569	1" sweat union kit	1.1	**143.00**

NA255160 Solar pump stations fitting kits. (mix & match for top & bottom)

Code	Description	Lbs	USD
NA15570	1¼" male, 1" SolarFlex™	0.9	**59.20**

SOLAR GLYCOL

NA101 SolarHD™

tech. broch. 01282

Pre-mixed 50% high temperature non toxic glycol, FDA reference: 21 CRF 182.1666, Gosselin TOXICITY INDEX 1, Generally recognized as safe for use as direct food additives. NSF listed, Category Code: HT1, HT2, NSF Registration No. 144912. Compatable with other propylene glycols.

Code	Description	Lbs	USD
NA10103	5 gallon bucket	45.0	**252.80**

FILL AND FLUSH CART

NA255 HYDROFLUSH™

tech. broch. 01280

The fill and flush pump cart is portable, leak-tested for a safe, quick and clean way to fill and flush solar and hydronic systems.
Medium: water, glycol and cleaning fluids.
Tank: 13 gallon with dirt filter.
Max. tank medium temperature: 150°F.
Pump delivery flow: 1—13 gpm
Pump feet of head: 220
Max. pump pressure: 100 psi.
Pump power: ½ HP (120 V AC).
Isolating ball valves: ¾" garden hose thread.
Transfer hoses: 6' with ¾" GHT (2 ea).
Pressure gauge: 2" dial, 0—100 psi.
Dimensions: 48"H × 20"W × 18"D.

Code	Description	Lbs	USD
NA25510	Wash, fill and flush cart	60	**2,772.00**

AUTOMATIC AIR VENT

250

tech. broch. 01133

Automatic air vent for solar systems.
Working temperature range: -20—360°F.
Max. working pressure: 150 psi.
Max. discharge pressure: 75 psi.

Code	Description	Lbs	USD
250041A	½" NPT male	0.3	**78.80**

NA292

tech. broch. 01133

Shut-off fits automatic air vent.
Working temperature range: -20—360°F.
Max. working pressure: 150 psi.

Code	Description	Lbs	USD
NA29284	½" NPT female x ½" NPT male	0.2	**64.10**

NA102

Vent cap adapter to connect discharge tube. Fits all air vents and air separators except 5026 and 5027 series.

Code	Description	Lbs	USD
NA10204	¼" NPT male	0.1	**27.30**

251 DISCALAIR®

tech. broch. 01135

High-performance automatic air vent for solar heating systems.
Working temperature range: -20—320°F.
Max. working pressure: 150 psi.
Max. discharge pressure: 150 psi.

Code	Description	Lbs	USD
251004A	½" NPT female	0.8	**157.30**

AIR SEPARATOR

251 DISCAL™

tech. broch. 01134

Air separator for solar heating systems.
Working temperature range: -20—320°F.
Max. working pressure: 150 psi.
Max. discharge pressure: 150 psi.
Connections: Main, ¾" NPT, female
Bottom, ½" NPT, female

Code	Description	Lbs	USD
251003A	¾" NPT female	2.0	**208.80**

253

tech. broch. 01089

Safety relief valves for solar systems.
Working temperature range: -20—360°F.
Normal pressure: 150 psi.
Opening over pressure: 10%.
Closing differential: 20%.
Discharge capacity: 171,000 Btu.
Connections: Inlet, ½" female.
Discharge, ¾" female.
TÜV certified to TRD-721-SV100 7.7.
Meets ANSI Z21.22 standard.

TÜV Rheinland is an approved U.S. Nationally Recognized Testing Laboratory (NRTL) Certification Body for Pressure Equipment. Meets ANSI Z21.22 "Relief Valves for Hot Water Supply Systems."

Code	Description	Lbs	USD
253042	Factory set to 35 psi	0.3	**78.50**
253043	Factory set to 45 psi	0.3	**78.50**
253044	Factory set to 60 psi	0.3	**78.50**
253046	Factory set to 90 psi	0.3	**78.50**
253048	Factory set to 120 psi	0.3	**78.50**
253040	Factory set to 150 psi	0.3	**78.50**

LOW LEAD MIXING VALVES

2521

tech. broch. 01127

Adjustable thermostatic three-way mixing valve for solar systems with built-in inlet check valves.
Setting range: 80—150°F.
Max. working pressure: 200 psi.
Max. inlet temperature: 210°F.
Connection: ½", ¾", 1" sweat.
Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1017

Code	Description	Lbs	USD
252149A	½" sweat with inlet check valves	1.2	**252.90**
252159A	¾" sweat with inlet check valves	1.2	**266.50**
252169A	1" sweat with inlet check valves	1.2	**308.70**

2521

tech. broch. 01127

Adjustable thermostatic three-way mixing valve with temperature gauge for solar systems with built-in inlet check valves.
Setting range: 80—150°F.
Max. working pressure: 200 psi.
Max. inlet temperature: 210°F.
Connection: ¾", 1" sweat.
Certified to ASSE 1017, CSA B125.3, UPC, IPC, Low Lead Laws and listed by ICC-ES for use in accordance with the U.S. and Canadian plumbing codes.

ASSE 1017

Code	Description	Lbs	USD
252158A	¾" sweat with inlet check valves	1.2	**327.40**
252168A	1" sweat with inlet check valves	1.2	**372.50**

Check valve for use in 2521 mixing valve.
Max. inlet temperature: 210°F.

Code	Description	Lbs	USD
R29326	Check valve insert	0.1	**9.35**

STAINLESS STEEL PIPING

NA35 SolarFlex™

tech. broch. 01172

SolarFlex™ stainless steel piping with EPDM insulation. Used to connect solar collector with storage tank. Integrated sensor cable saves time and reduces cost. Packaged in a 50 foot continuous coil ensures a leak-free installation.
Max. working pressure: 150 psi.
Max. fluid temperature: 350ºF.
Min. surface temperature: -60ºF.
Min. bend radius: 5".
Flammability: Class VO.
Flame spread/smoke density: 25/50.
Agency approvals: ASTM D 635
ASTM C 177
Includes fitting kit.

Code	Description	Lbs	USD
NA3520-15	½" Pipe, 50' coil	24	**1,575.00**
NA3540-15	¾" Pipe, 50' coil	27	**1,785.00**
NA3560-15	1" Pipe, 50' coil	40	**2,415.00**
NA3540-B*	¾" Pipe, 165' spool (order per ft)	0.5	**30.00**

* NAS3540-B is cut lengths up to 100', (above 100', must order full 165'spool) price per foot (minimum 10' length), without fitting kit, order NA12103 below.

NA121

tech. broch. 01172

SolarFlex™ extra connection kits.

Code	Description	Lbs	USD
NA12102	½" SolarFlex™, ¾" nuts and washers	1.0	**39.90**
NA12103	¾" SolarFlex™, 1" nuts and washers	1.1	**53.80**
NA12104	1" SolarFlex™, 1¼" nuts and washers	1.3	**86.10**

NA121

tech. broch. 01172

SolarFlex™ pipe hangers with hardware. (4 per pack)

Code	Description	Lbs	USD
NA12132	½" SolarFlex™ hangers	1.2	**48.20**
NA12133	¾" SolarFlex™ hangers	1.3	**50.70**
NA12134	1" SolarFlex™ hangers	1.0	**57.10**

NA350

tech. broch. 01172

EPDM foam UV resistant insulating tape to wrap fitting connections.

Code	Description	Lbs	USD
NA35001	2" x 1/8" x 25' roll	1.3	**93.10**

Black film UV resistant film tape to wrap foam tape.

Code	Description	Lbs	USD
NA35002	2" x 30' roll	0.5	**19.80**

4' lengths black braid sleeve (UV & vermin resistant) (2) to protect outdoors piping with black film tape.

Code	Description	Lbs	USD
NA35007	4' Sleeve with 2" x 30' film tape	1.0	**78.90**

NA350

tech. broch. 01172

SolarFlex™ sliding piston flattening tool. Three sizes of jaws to match SolarFlex™ pipe sizes.

Code	Description	Lbs	USD
NA35003	Sliding piston tool	5.0	**315.00**
NA35004	½" Fixed jaw	3.0	**593.00**
NA35005	¾" Fixed jaw	3.0	**593.00**
NA35006	1" Fixed jaw	3.0	**593.00**

½" FLEX FITTINGS WITH ¾" THREADS

Double nipple.

Code	Description	Lbs	USD
NA12122	¾" male x ¾" male	0.3	**27.30**

Double nipple.

Code	Description	Lbs	USD
NA12172	¾" NPT x ¾" NPT	0.3	**27.30**

Union nut.

Code	Description	Lbs	USD
R41298/C	¾" union nut	0.1	**4.60**

C-clip.
(Priced each, sold in package of 10 each)

Code	Description	Lbs	USD
NA12112	½" flex "C" clip	0.1	**3.70**

Union washer
(Priced each, sold in package of 10 each)

Code	Description	Lbs	USD
R50058	¾" union washer	0.1	**1.80**

Sweat tail piece.

Code	Description	Lbs	USD
NA10001	½" sweat fits ¾" union nut	0.3	**12.50**

Sweat adapter.

Code	Description	Lbs	USD
NA10118	¾" sweat x ¾" male thread	0.3	**27.30**

Double nipple with O-ring.

Code	Description	Lbs	USD
NA12152	¾" male w/ O-ring x ¾"male thread	0.3	**29.20**

NPT tail piece.

Code	Description	Lbs	USD
F31868	½" NPT fits ¾" union nut	0.1	**15.10**

Compression adaptor.

Code	Description	Lbs	USD
254452	22mm comp. w/ ¾" male thread	0.2	**31.80**

Compression elbow adaptor.

Code	Description	Lbs	USD
254752	22mm comp. elbow w/ ¾" male thd.	0.2	**36.30**

¾" FLEX FITTINGS WITH 1" THREADS

Double nipple.

Code	Description	Lbs	USD
NA12123	1" x 1" male thread	0.4	**34.10**

Double nipple.

Code	Description	Lbs	USD
NA12173	1" NPT x 1" NPT	0.4	**34.10**

Union nut. Low-lead brass.

Code	Description	Lbs	USD
F61008	1" brass nut	0.2	**5.70**
F61008/C	1" chrome-plated nut	0.2	**6.80**

C-clip.
(Priced each, sold in package of 10 each)

Code	Description	Lbs	USD
NA12113	¾" flex "C" clip	0.1	**5.70**

Union washer.
(Priced each, sold in package of 10 each)

Code	Description	Lbs	USD
F50055	1" union washer	0.1	**2.10**

¾" FLEX FITTINGS WITH 1" THREADS

Union washer.
High temperature silicone rubber.
Working temperature: -40—350°F.
(Priced each, sold in package of 10 each)

Code	Description	Lbs	USD
NA10302	1" union washer high temp silicone	0.1	**3.20**

Sweat tail piece.
Low lead brass.

Code	Description	Lbs	USD
NA10002	½" sweat fits 1" union nut	0.3	**12.50**

Sweat tail piece.
Low lead brass.

Code	Description	Lbs	USD
NA10003	¾" sweat fits 1" union nut	0.4	**14.50**

NPT tail piece.
Low lead brass.

Code	Description	Lbs	USD
31901A	¾" NPT fits 1" union nut	0.4	**15.60**

Sweat tail piece with nut.
Low lead brass.

Code	Description	Lbs	USD
59834A	1" sweat w/ 1" union nut	0.5	**25.20**

Bushing adaptor.

Code	Description	Lbs	USD
NA10060	¾" NPT female w/ 1" male thread	0.3	**27.30**

Sweat adaptor.

Code	Description	Lbs	USD
NA10061	¾" sweat adaptor w/ 1 " male thd.	0.2	**28.50**

Sweat adaptor.

Code	Description	Lbs	USD
NA10062	1" sweat adaptor w/ 1" male thd.	0.2	**29.50**

Nipple adaptor.

Code	Description	Lbs	USD
NA10064	1" NPT w/ 1" male thread	0.2	**30.70**

Nipple adaptor with O-ring.

Code	Description	Lbs	USD
NA12162	¾" male w/ O -ring x 1" male thread	0.2	**31.60**

Bushing.

Code	Description	Lbs	USD
NA10089	¾" female thread x 1" male thread	0.1	**22.70**

Smooth pipe adaptor.

Code	Description	Lbs	USD
NA10085	22mm pipe w/ 1" male thread	0.2	**26.10**

Compression elbow adaptor.

Code	Description	Lbs	USD
NA254712	22mm comp. elbow w/ 1" male thd.	0.4	**43.20**

1" FLEX FITTINGS WITH 1¼" THREADS

Double nipple.

Code	Description	Lbs	USD
NA12124	1¼" x 1¼" thread	0.4	**54.60**

Sweat tail piece.

Code	Description	Lbs	USD
NA10042	1" sweat fits 1¼" union nut	0.3	**29.50**

Union nut.

Code	Description	Lbs	USD
R31495	1¼" union nut	0.2	**9.10**

NPT tail piece.

Code	Description	Lbs	USD
NA10116	1" NPT male fits 1¼" union nut	0.3	**44.80**

C-clip.
(Priced each, sold in package of 5 each)

Code	Description	Lbs	USD
NA12114	1' flex "C" clip	0.1	**9.10**

Sweat adaptor.

Code	Description	Lbs	USD
NA10119	1" sweat adapter x 1¼" union thread	0.4	**37.50**

Union washer.
(Priced each, sold in package of 5 each)

Code	Description	Lbs	USD
R50056	1 ¼" union washer	0.1	**3.30**

Bushing.

Code	Description	Lbs	USD
NA10087	1" female x 1 ¼" male bushing	0.4	**27.50**

Gasket- black.

Code	Description	Lbs	USD
R67032	1-1/4" high temp silicon	0.1	**2.80**

Bushing.

Code	Description	Lbs	USD
61215A	1" NPT female x 1¼" male bushing	0.8	**27.30**

Sweat tail piece.
Low lead brass.

Code	Description	Lbs	USD
NA10114	¾" sweat fits 1¼" union nut	0.2	**29.50**

Nipple adaptor.

Code	Description	Lbs	USD
R31706	1" male x 1¼" male nipple	0.3	**34.10**

DIFFERENTIAL TEMPERATURE CONTROLLERS

Code	Description	Lbs	USD
257220A	*iSolar*™ 2, 1 relay	2.0	**500.00**
257260A	*iSolar*™ Plus, 2 relays	2.0	**760.00**
257260A PV1	*iSolar*™ Plus, 2 relays, 12 V DC	2.0	**760.00**
257260A PV2	*iSolar*™ Plus, 2 relays, 24 V DC	2.0	**760.00**

Model Comparison	***iSolar* 2**	***iSolar* Plus**	***iSolar* BX**	***iSolar* MX-LTE**
Pre configured arrangements	1	10	26	20
Speed control triac output (30–100%)	1	2	3	4
Standard relay output	0	0	1	0
Dry contact relay	0	0	0	1
Sensor inputs (temperature)	4	4	5	8
Pt-1000 temp. sensors included	3	4	4	5
Max. solar collector arrays	1	2	2	2
Max. solar storage tanks	1	2	2	4
Two tank priority logic		•	•	•
Second delta T-function		•	•	•
Drain-back pump speed control	•	•	•	•
Drain-back booster pump		•	•	•
Time controlled thermostat function		•	•	•
Backup heat function		•	•	•
Heat dump function		•	•	•
Real time clock (timer function)		•	•	•
Collector freeze protection	•	•	•	•
Evacuated tube collector function		•	•	•
Min. collector temperature	•	•	•	•
Collector cooling functions	•	•	•	•
Tank (night time) cooling	•	•	•	•
Emergency shutdown functions	•	•	•	•
Pump operating hours counter	•	•	•	•
Energy metering - flow calculated	•			
Energy metering - flow meter input		•	•	•
Vbus data communication	•	•	•	•
Onboard data logging			•	•

257 *iSolar*™

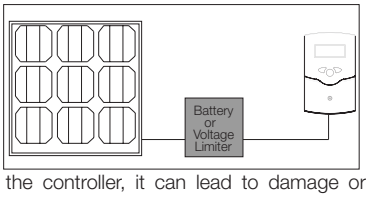
tech. broch. 01174

The *iSolar*™ 257 series are multi-functional temperature differential controllers that provide complete control of the solar thermal system.
Inputs: (4) Pt1000 temperature sensors
Triac relays capacities: 1A / 100—240 V AC.
Standard relay capacity: 1A / 100—240 V AC.
Power supply: 100—240 V AC- 50/60 Hz.
Power supply: PV1 -12 V DC, PV2 - 24V DC
Data interface: V-Bus.
ΔT adjustment range: 2—40ºF Δ.
Min. temperature differential 2ºF Δ.
Hysteresis: 2ºFΔ, ± 1ºFΔ.
Max. tank temperature range: 35—205°F.
Max. collector temperature range: 210—375°F.
Emergency shut down of the collector: 230—395°F.
Min. collector temperature range: 50—195ºF.
Antifreeze temperature option: 15—50°F.
kWh (BTU) calculation flow input: 0—5 gpm.

Function

The *iSolar*™ series are multi—functional temperature differential controllers that provide complete control of the solar thermal system for safe and long-lasting operation. The microprocessor based controller monitors and controls thermal solar systems by means of a collector sensor and a storage tank sensor. The controllers also perform important system monitoring and safety functions. The system parameters and measured values can be changed and viewed on the large LCD display. The controller is equipped for up to four temperature sensor inputs and one or two 120 VAC outputs (some models) for activating the solar circuit pump and second 120 VAC output for activating a valve or second pump. The controller is additionally equipped with VBus® for two-way communication between modules, PC's or data loggers.

Note:
Do not directly connect *iSolar*™ Plus PV1, 12 volt or *iSolar*™ Plus PV2, 24 volt, to DC solar photovoltaic panel or any other power source that exceeds 15% over voltage. If the power supply voltage is 15% greater than the rated input voltage of the controller, it can lead to damage or destruction of the product.



Replacement fuse T4A.
(priced per package of 10).

Code	Description	Lbs	USD
257208	Fuses	0.1	**31.50**

NA101

Steel electrical mounting box with cover for *iSolar*™ controllers.
UL listed

Code	Description	Lbs	USD
NA10120	1⅝" D x 8⅝" H x 4½" W	3.0	**73.50**

VBUS DATA INTERFACE

SD3

Smart display SD3 connected to VBus data interface is used for displaying data from *iSolar*™ controller; collector temperature, storage temperature and total energy heat produced. An additional power supply is not required. Bright LED displays.
Power supply: via VBus.
Mounting: wall.

Code	Description	Lbs	USD
NA15008	Smart display	2.0	**754.00**

SP10

The lightning protector SP10 device is used to protect the collector temperature sensor and controller against external over-voltages such as those caused by lighting strikes.

Code	Description	Lbs	USD
NA15006	Lightning protector	0.2	**80.85**

WALL

Wall transformer.
Input voltage: 120 V AC
Output voltage: 24 V AC.
Power output: 40 VA.
Agency approval: cULus

Code	Description	Lbs	USD
NA605010	24 V AC wall transformer	1.0	**46.60**

USB

USB to VBus data interface to connect *iSolar*™ controller to PC for transmission of system data for processing, visualizing and archiving.
Full version of Service Center software included on CD-ROM. USB 2.0 full speed with mini-USB port and cable.
Power supply: via VBus.

Code	Description	Lbs	USD
NA15020	USB to VBus data interface	0.3	**265.70**

PWM

PWM or 0—10 V DC to VBus data interface is used for speed control of a pump.
Information from the iSolar™ controller is converted into a PWM or 0—10 V DC output control signal which is connected to input control signal of a pump.
Display: LED display.
Wall power: 100-240 V AC / 50-60 Hz.
Adapter input voltage: 12 V DC.

Code	Description	Lbs	USD
NA15021	PWM or 0—10 V DC to VBus interface	0.3	**355.00**

LAN

LAN socket to VBus data interface to connect controller to PC network or router for transmission of system data for processing, visualizing and archiving over a local network. Full version of Service Center software included.
Wall power: 100-240 V AC / 50-60 Hz.
Adapter input voltage: 12 V DC.

Code	Description	Lbs	USD
NA15022	LAN socket to VBus data interface	0.3	**441.00**

DIFFERENTIAL TEMPERATURE CONTROLLERS

257
iSolar™ BX

tech. broch. 01273

Inputs: (5) Pt1000 temperature sensors, 2 analog Grundfos Direct Sensors™, impulse flow meter
Outputs: (3) triac and (1) standard relays.
Triac relays capacities: 1A / 115 V.
Standard relay capacity: 2A / 115 V.
Power supply: 100—240 V - 50/60 Hz.
Data interface: V-Bus, SD card slot
ΔT adjustment range: 2—40ºFΔ.
Min. temperature differential 2ºFΔ.
Hysteresis: 2ºFΔ, ± 1ºFΔ.
Max. tank temperature range: 35—205°F.
Max. collector temperature range: 210—375°F.
Emergency shut down of the collector: 230—395°F.
Min. collector temperature range: 50—195ºF.
Antifreeze temperature option: 15—50°F.
kWh (BTU) flow input: 0—26 gpm.

Tested and Approved by TÜV Rheinland as an approved U.S. Nationally Recognized Testing Laboratory (NRTL)
Exceeds or is equivalent to:
UL 60730-1A
CAN/CSA E60730-1

Code	Description	Lbs	USD
257270A	*iSolar*™ BX	3.0	**1,025.00**

Function

The i*Solar*™ BX is a multi-functional temperature differential controller with add-on system functions for use in a wide variety of solar thermal heating applications. *iSolar*™ BX is equipped with four relay outputs; three triac pump speed control relays and one standard relay. The controller is equipped with five Pt1000 sensor inputs, two analog Grundfos sensor inputs, and one impulse flow meter input. Twenty six system configuration options are predefined for control of a standard solar water heating system, drainback systems, supplemental space heating, multiple storage tanks, heat dump and storage tank booster heating. Unique features include built-in SD memory card slot, built-in clock and calendar, integrated energy heat measurement inputs, parallel relay operation and drain back control.

NA100

18" SJ round cord, stripped and pre-tinned for connecting pump or valve to *iSolar* controller.

Code	Description	Lbs	USD
NA10092	18" SJ round cord	0.3	**9.50**

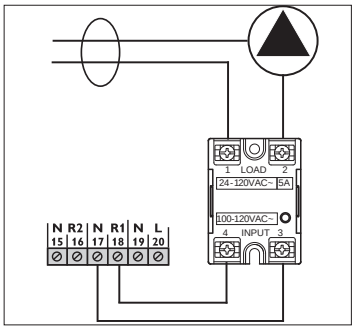
NA150

Cable for connecting Grundfos VFS & RPS with molded plug to BX controller with molded plug.

Code	Description	Lbs	USD
NA15028	VFS & RPS molded plug cable, 10'	0.2	**26.30**

NA150

SSRs (Solid State Relays) is an isolation speed control relay which will speed control up to a 5 Amp solar pump based on the output speed control voltage of the iSolar solar controllers.



NA150

Steel electrical mounting box with cover fits *iSolar*™ BX controller.

Code	Description	Lbs	USD
NA15027	Electrical box	5.0	**84.00**

Code	Description	Lbs	USD
NA15012	120 VAC / 5A	0.1	**168.00**

FLOW METERS

Cable for connecting Grundfos VFS & RPS with molded plug to BX controller with molded plug.

Code	Description	Lbs	USD
NA15028	VFS & RPS cable, 10' length	0.2	**26.30**

RPS Grundfos analog pressure/ temperature sensor. Requires NA15028 cable.
Pressure measuring range: 0—150 psi.
Temperature measurement range: 32—210ºF.
Max. fluid temperature: 250ºF
Maximum Glycol: 50%.
Connection: ½" male NPT.

Code	Description	Lbs	USD
NA15010	RPS 0—10, 0—150 psi	0.3	**198.50**

RPS Grundfos analog pressure / temperature sensor. In-line body. Requires NA15028 cable.
Pressure measuring range: 0—150 psi.
Temperature measurement range: 32—210ºF.
Max. fluid temperature: 250ºF
Maximum Glycol: 50%.
Connection: 1" male union thread.
Select union fittings on the right.

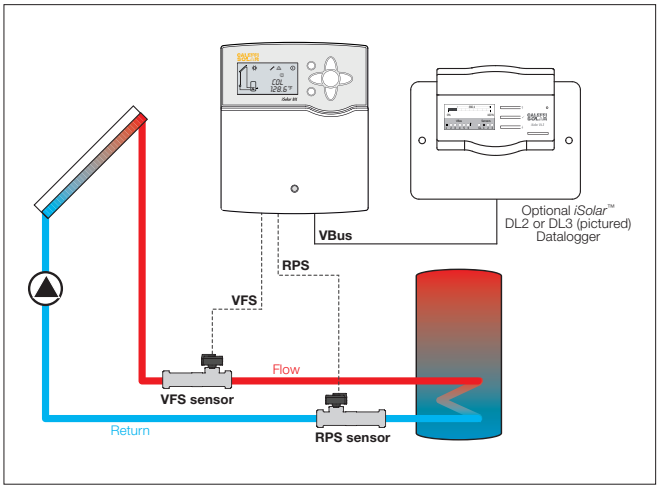
Code	Description	Lbs	USD
NA15014	RPS 0—10, 0—150 psi	0.6	**243.80**

VFS Grundfos analog flow / temperature sensor. Requires NA15028 cable.
Temperature measurement range: 32—210ºF.
Max. fluid temperature: 250ºF
Flow measurement accuracy: 1.5%
Flow response time: < 1 sec.
Brass or stainless in-line body.
Maximum glycol: 50%.
Connection: 1" male union thread.
Select union fittings on the right.
Flow measurement accuracy: 1.5%
Flow response time: <1 sec.

Code	Description	Lbs	USD
NA15015	VFS 1-12, ¼—3 gpm	0.6	**334.50**
NA15016	VFS 2-40, ½—10 gpm	0.6	**368.60**
NA15017	VFS 5-100, 1½—15 gpm	1.6	**641.00**

VFS Grundfos analog flow / temperature sensor. Requires NA15028 cable.
Temperature measurement range: 32—210ºF.
Max. fluid temperature: 250ºF
Flow measurement accuracy: 1.5%
Flow response time: < 1 sec.
Composite in—line body.
Sweat unions included.
Maximum glycol: 50%.
Flow measurement accuracy: 1.5%
Flow response time: <1 sec.

Code	Description	Lbs	USD
NA15018	VFS 10-200, 2½—20 gpm, 1" sweat	1.7	**907.00**
NA15019	VFS 20-400, 5—45 gpm, 1¼" sweat	3.8	**1,361.00**



Two union nuts, washers and tail pieces.
Low-lead brass.

Code	Description	Lbs	USD
NA12240	½" NPT with 1" union nuts	0.2	**42.80**
NA12249	½" sweat with 1" union nuts	0.2	**40.50**

Two union nuts, washers and tail pieces.
Low-lead brass.

Code	Description	Lbs	USD
NA12250	¾" NPT with 1" union nuts	0.2	**46.80**
NA12259	¾" sweat with 1" union nuts	0.2	**44.50**

Two union nuts, washers and tail pieces.
Low-lead brass.

Code	Description	Lbs	USD
NA12260	1" NPT with 1" union nuts	0.3	**56.90**
NA12269	1" sweat with 1" union nuts	0.3	**54.60**

DIFFERENTIAL TEMPERATURE CONTROLLERS

257
iSolar™ MX LTE

tech. broch. 01274

Inputs: (8) Pt1000 temperature sensors.
(1) V40 rotary impulse meter.
(1) CS10 irradiation sensor.
Outputs: (4) triac relays, (1) dry contact relay and (1) PWM / 0-10 V DC.
Triac relays capacities: 1A / 120 V.
Dry contact relay capacity: 2A / 24 V.
Power supply: 100—240 V - 50/60 Hz.
Data interface: V-Bus, SD card slot.
ΔT adjustment range: 2—40ºFΔ.
Min. temperature differential 2ºFΔ.
Hysteresis: 2ºFΔ, ± 1ºFΔ.
Max. tank temperature range: 35—205°F.
Max. collector temperature range: 210—375°F.
Emergency shut down of the collector: 230—395°F.
Min. collector temperature range: 50—195ºF.
Antifreeze temperature option: 15—50°F.
kWh (BTU) flow input: 0—99 gpm.
Note: Do not attach Grundfos analog sensors

Function

The *iSolar*™ MX LTE is a multi-functional temperature differential controller with add-on system functions for use in a wide variety of solar thermal heating applications. *iSolar*™ MX LTE is equipped with four triac pump speed control relays and one dry contact relay. The controller is equipped with eight Pt1000 sensor inputs, one V40 impulse flow meter input and one CS10 irradiation sensor input. Several system configuration options are predefined for control of a standard solar water heating system, drainback systems, supplemental space heating, multiple storage tanks, heat dump and storage tank booster heating. Unique features include built-in SD memory card slot, built-in clock and calendar, integrated energy heat measurement inputs, parallel relay operation and drain back control.

Code	Description	Lbs	USD
257280A LTE	*iSolar*™ MX LTE	3.0	**1,260.00**

NA150

Steel electrical mounting box with cover fits *iSolar*™ MX LTE controller.

Code	Description	Lbs	USD
NA15027	Electrical box	5.0	**84.00**

CS10

The solar cell is used for measuring the irradiation intensity. The short-circuit current rises with increasing irradiation intensity. Depending on the controller, the sensor can also be used for additional indirect or direct control. The connecting two wire cable can be extended to 300 ft.

Code	Description	Lbs	USD
NA257102	Solar irradiation sensor	0.1	**262.50**

FAP13

The FAP13 is used for measuring the outdoor temperature with a PT1000 (platinum measuring element), 1000 Ohm. The FAP13 is placed in a weather resistant housing designed for mounting outdoors.

Code	Description	Lbs	USD
NA15023	Outdoor air temperature sensor	0.3	**157.50**

NA100

18" SJ round cord, stripped and pre-tinned for connecting pump or valve to *iSolar* controller.

Code	Description	Lbs	USD
NA10092	18" SJ round cord	0.3	**9.50**

FLOW METERS

V40

tech. broch. 01275

Single jet rotary pulse flow meter measures liquid flow for energy heat metering production or consumption. Accurate to International Standards OIML R75, EN1434 and MID.
Brass body.
Sweat connections included.
Working temperature range: -40°—210°F.
Max. fluid temperature: 265°F
Max. working pressure: 235 psi.
Maximum glycol: 50%.

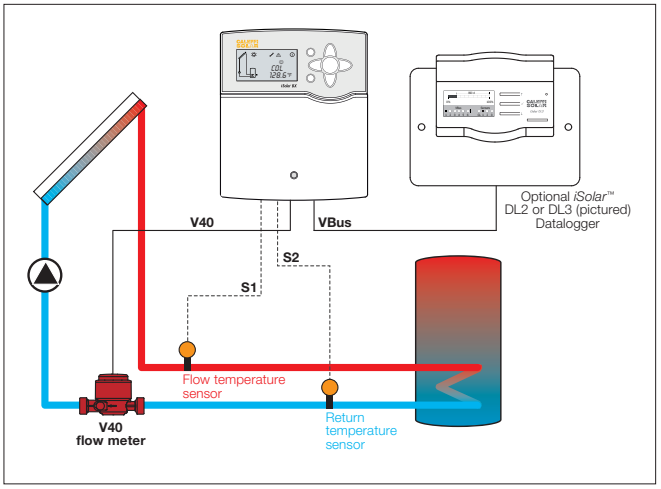
Code	Description	Lbs	USD
NA79701	¼—10 gpm, ¾" sweat	3.0	**685.00**

V40

tech. broch. 01275

Multi-jet rotary pulse flow meter measures liquid flow for energy heat metering production or consumption. Accurate to International Standards OIML R75, EN1434 and MID.
Brass body.
Sweat connections included.
Working temperature range: -40°—210°F.
Max. fluid temperature: 265°F
Max. working pressure: 235 psi.
Maximum glycol: 50%.

Code	Description	Lbs	USD
NA79702	½—15 gpm, 1" sweat	5	**1,210.00**
NA79703	½—25 gpm, 1¼" sweat	8	**1,420.00**
NA79704	1—45 gpm, 1½" sweat	14	**1,735.00**
NA79705	1½—65 gpm, 2" sweat	17	**2,500.00**



REPLACEMENT TEMPERATURE SENSORS FOR ISOLAR™

FKP6 collector Pt1000 sensor with 5' black UV cable, Platinum RTD type, 1000 Ohm, -58—355°F, ¼" Ø O.D.

Code	Description	Lbs	USD
257205	Black collector sensor	0.2	**62.00**

FRP6 storage tank Pt1000 sensor with 8' gray cable, Platinum RTD type, 1000 Ohm, 15—200°F, ¼" Ø O.D.

Code	Description	Lbs	USD
257206	Gray storage sensor	0.2	**57.80**

FKP9 collector screw mount Pt1000 sensor with 5' black cable, Platinum RTD type, 1000 Ohm, -58—355°F, ¼" Ø O.D.

Code	Description	Lbs	USD
257207	Black collector sensor	0.2	**93.50**

Sensor well, ¼" Ø I.D. fits Pt1000 temperature sensors 257205 and 257206. Insertion length: 1¾".

Code	Description	Lbs	USD
NA10090	Sensor well, ½" NPT male thread	0.5	**36.40**
NA15029	Sensor well, ¾" NPT male thread	0.5	**55.70**

DATA LOGGERS

257 *iSolar*™ DL2

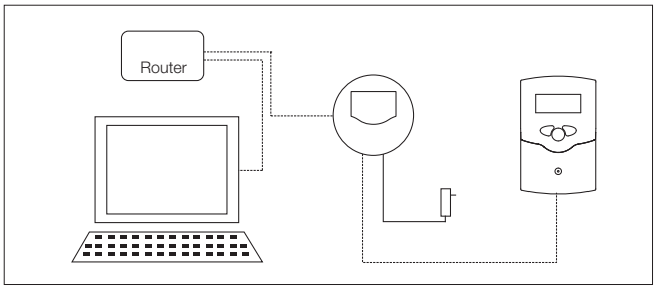
iSolar™ DL2 intelligent web enabled datalogger connects to VBus data terminals on one *iSolar*™ controller.
VBus input terminals: 1.
Ethernet connection: RJ45 socket.
Integrated SD slot: 1.
Ambient temperature: 32—100°F.
Input voltage: 5 VDC ±5%.
Power voltage adapter: 100—240 V.
Max. current: 350 mA.

Code	Description	Lbs	USD
257201A	Datalogger	2.0	**1,056.00**

Function

The DL2 datalogger enables the acquisition and storage of large amounts of data such as energy heat metering and recorded values of the solar system over a long period of time when connected to an *iSolar*™ series controller. The datalogger, when connected to a network through the integrated Ethernet socket, can be configured and viewed with any standard internet browser via its integrated web interface, without additional software. Download data through the web interface or an SD memory card for further data processing in spreadsheet programs.

System layout



VBus.net

VBus.net is a service portal that offers access to solar thermal system data from all over the world. No DNS router configuration is required. To use VBus.net service, the system must be equipped with a Caleffi iSolar™DL2 or DL3 Data Logger. After signing on at www.VBus.net, the Data Logger can be registered with the system. VBus.net enables users to access their solar thermal system data from all over the world, just by using a regular web browser. No additional software or app is required, only a registered account for the VBus.net service, a web browser and internet connection. Many mobile devices are supported as well.

257 *iSolar*™ DL3

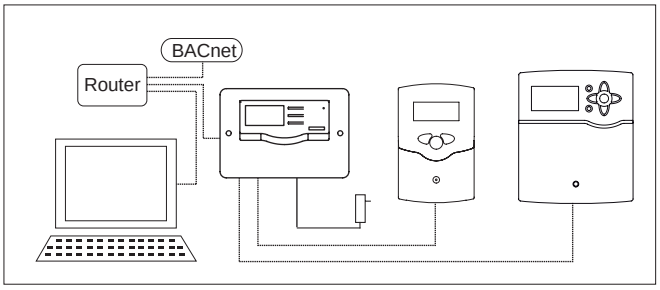
iSolar™ DL3 intelligent web enabled datalogger / BACnet IP gateway connects to VBus data terminals on six *iSolar*™ controllers.
VBus input terminals: 6.
Pt1000 sensor inputs: 3.
Current loop input: 4—20 mA.
Ambient temperature: 32—100°F.
Input voltage: 12 VDC ±5%.
Power voltage adapter: 100—240 V.
Max. current: 1 A.
Ethernet connection: RJ45 socket.
USB connection: 1.
Integrated SD card: 1 slot.

Code	Description	Lbs	USD
257204A	Datalogger with BACnet IP	2.0	**1,890.00**

Function

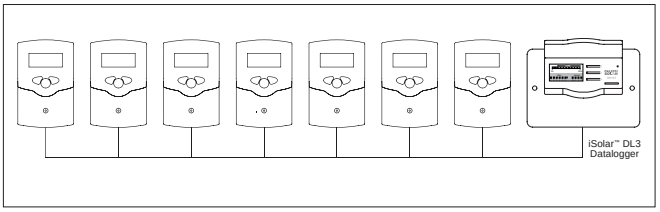
The DL3 datalogger / BACnet/IP gateway provides communication translation between iSolar™ controllers and DDC system which are capable of BACnet/IP communications. Conforms with BACnet PICS, Up to six *iSolar*™ controllers can be connected to DL3 with two conductor wire (bell wire) at least 20 AWG up to a distance of 150 feet. The DL3 has three additional inputs for Pt1000 temperature sensors and one 4—20 mA Current Loop analog input. A configurable IP address and password protection allows for access from any PC with an internet connection. Download data through the web interface, an SD memory card or USB cable for further data processing in spreadsheet programs.

System layout



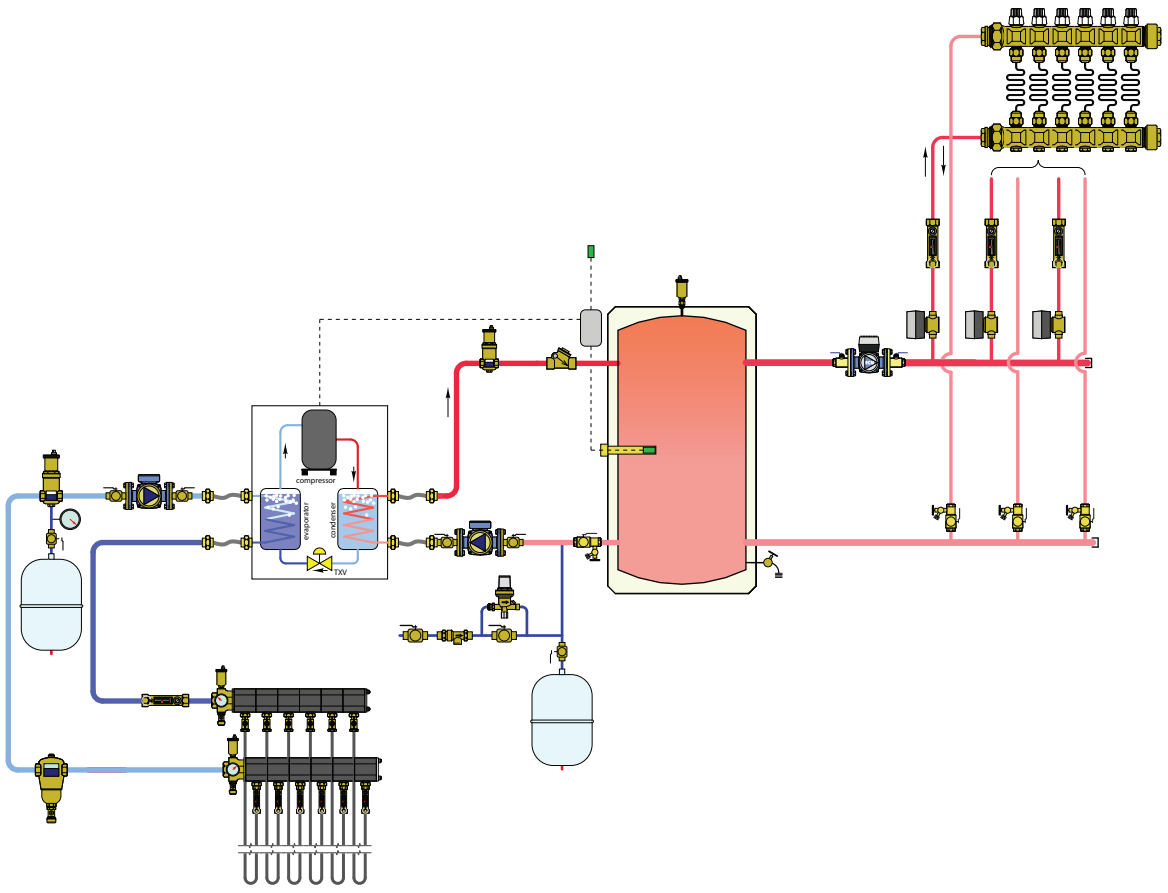
Multinode network

Multiple WMZ or WMZ-G1 energy heat meters can be cascaded together on the VBus connection. One WMZ is configured as the master and additional WMZ meters are configured as slaves. Up to 16 meters can be cascaded together with two conductor wire (bell wire) at least 20 AWG and up to 150 feet for transmission of data values to a connected PC, DL2 or DL3 Datalogger. The connection sequence is arbitrary, up to 16 can be cascaded together.



GEOTHERMAL COMPONENTS

This diagram is an example



Geothermal manifolds, GeoCal™

PE pipe connections, GeoGrip™

Balancing valves, QuickSetter™

Storage tanks, ThermoCon™

Wall penetration seals, GeoSeal™

Automatic air vents, DISCALAIR®

MANIFOLDS

110 GeoCal™

tech. broch. 03175

GeoCal™ left hand distribution manifold assemblies with temperature gauges, air vents and drain valves.
1¼" F NPT brass inlet/outlet ports.
Max. working pressure: 90 psi.
Max. system test pressure: 150 psi.
Working temperature range for: water, glycol & saline solutions: 15—140ºF.
ethanol & methanol solutions: 15—90ºF.
Ambient temp. range: -5—140ºF.
Max. flow rate: 24 gpm total all circuits.

Code	Description	Lbs	USD
1107B5LA	Left side connections, 2 circuits	16	**1,260.00**
1107C5LA	Left side connections, 3 circuits	18	**1,390.00**
1107D5LA	Left side connections, 4 circuits	20	**1,530.00**
1107E5LA	Left side connections, 5 circuits	22	**1,660.00**
1107F5LA	Left side connections, 6 circuits	23	**1,790.00**
1107G5LA	Left side connections, 7 circuits	25	**1,950.00**
1107H5LA	Left side connections, 8 circuits	26	**2,080.00**

GeoCal™ right hand distribution manifold assemblies with temperature gauges, air vents and drain valves.
1¼" F NPT brass inlet/outlet ports.
Max. working pressure: 90 psi.
Max. system test pressure: 150 psi.
Working temperature range for: water, glycol & saline solutions: 15—140ºF.
ethanol & methanol solutions: 15—90ºF.
Ambient temp. range: -5—140ºF.
Max. flow rate: 24 gpm total all circuits.

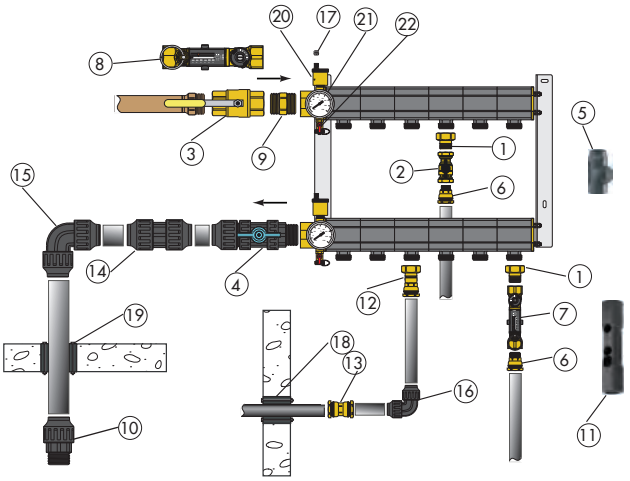
Code	Description	Lbs	USD
1107B5RA	Right side connections, 2 circuits	17	**1,260.00**
1107C5RA	Right side connections, 3 circuits	18	**1,390.00**
1107D5RA	Right side connections, 4 circuits	20	**1,530.00**
1107E5RA	Right side connections, 5 circuits	22	**1,660.00**
1107F5RA	Right side connections, 6 circuits	23	**1,790.00**
1107G5RA	Right side connections, 7 circuits	25	**1,950.00**
1107H5RA	Right side connections, 8 circuits	26	**2,080.00**

Function

The GeoCal™ pre-assembled manifold for ground-source geothermal loops offers an alternative method of piping parallel earth loops, bringing all circuits to a common manifold station without labor-intensive fusion welding. GeoCal™ allows easy individual circuit balancing. Shut-off ball valves installed on the return manifold allows for easy individual circuit purging and requiring a smaller purge/fill pump then traditionally used.

Manifold assemblies include supply and return manifolds, automatic air vents, dual-scale temperature gauges, fill/drain valves, brass end caps with insulation, wall brackets with mounting hardware and labels.

GeoCal™ manifold assemblies can be installed indoors, or in an outdoor vault.



1. Manifold outlet fitting 110050A/60A*
2. Ball valve NA39589/NA39753*
3. Ball valve NA39588
4. GeoGrip™ ball valve NA10268
5. Optional insulation shells for Isolation valves with inlet/outlet fittings 111001/003*
6. GeoGrip™ pipe coupling 861527A/634A*
7. QuickSetter™ 132552A/662A*
8. QuickSetter™ 132772A
9. Double nipple NA10263
10. GeoGrip™ male adapter NA10269
11. Insulation sleeve, 132552A and fittings 110050A and 861527A Insulation sleeve, 132662A and fittings 110060A and 861634A
12. GeoGrip™ manifold to earth loop pipe connector NA10246/247*
13. GeoGrip™ sleeve coupling 863027/034*
14. GeoGrip™ poly sleeve coupling for joining 1¼" x 1¼" PE piping NA863042
15. GeoGrip™ elbow NA866042, 1¼" x 1¼"
16. GeoGrip™ elbow NA866027/034*
17. Vent cap adapter NA10204
18. GeoSeal™ wall penetration seal NA10248/NA10249*
19. GeoSeal™ wall penetration seal NA10265
20. Air vent for manifolds 502043 CST
21. Manifold temperature gauge 687000
22. Drain valve 538402 FD

* Part numbers fits ¾" and 1" sizes

FITTINGS

110

GeoCal™ manifold outlet fitting, includes union nut and gasket.

Code	Description	Lbs	USD
110050A	¾" male NPT tail piece	0.4	**41.00**
110060A	1" male NPT tail piece	0.6	**45.00**

861

GeoGrip™ polyethylene pipe fittings.
For joining polyethylene pipe to 132 series QuickSetter™ or NA139 ball valves.

Code	Description	Lbs	USD
861527A CST	¾" M NPT x ¾" PE pipe compression	0.2	**25.00**
861634A CST	1" M NPT x 1" PE pipe compression	0.6	**40.00**
NA10288	¾" M NPT x 1" PE pipe compression	0.2	**53.30**

NA39

Brass ball valves
Brass body.
Max. working pressure: 150 psi.
Max. working temperature: 365°F.

Code	Description	Cv	Lbs	USD
NA39589	¾" NPT female w/T-handle	35	0.6	**40.00**
NA39753	1" NPT female w/T-handle	50	0.7	**54.50**
NA39588	1¼" NPT female w/Lever	104	1.0	**90.80**

111

Insulation sleeve for item valve and fitting on each end.

Code	Description	Lbs	USD
111001	Insulation sleeve fits NA39589	0.1	**49.00**
111003	Insulation sleeve fits NA39753	0.1	**51.00**

BALANCING VALVE

132

tech. broch. 01149

QuickSetter™ balancing valve with flow meter. Direct reading of flow rate.
Brass valve body and flow meter.
Graduated scale flow meter with magnetic movement flow rate indicator.
Max. working pressure: 150 psi.
Temperature range: 14—230°F.
Max. percentage of glycol: 50%.

Code	Description	Flow scale (gpm)	Lbs	USD
132552A	¾" NPT	2.0—7.0	1.8	**280.80**
132662A	1" NPT	3.0—10.0	2.4	**327.40**
132772A	1¼" NPT	5.0—19.0	2.8	**434.40**
132882A	1½" NPT	8.0—32.0	3.4	**514.60**
132992A	2" NPT	12.0—50.0	4.4	**631.40**
F19346	Replacement by-pass valve stem*		0.1	**51.20**

* With operating ring

112

QuickSetter™ Insulation sleeve for valve and fitting on each end.

Code	Description	Lbs	USD
112001	Insulation sleeve fits 132552A	0.1	**52.00**
112003	Insulation sleeve fits 132662A	0.1	**54.00**

NA102

GeoGrip™ ball valve with T—handle.
For connecting to 110 series manifold and polyethylene pipe.

Code	Description	Lbs	USD
NA10268	1¼" NPT x 1¼" PE pipe compression	1.0	**205.00**

NA102

Double Nipple fits 1 ¼" QuickSetter™ or Ball Valve for GeoCal™ main inlet.
Connecting 110 Series Manifold to 132772A valve or NA39588 ball valve.

Code	Description	Lbs	USD
NA10263	1¼" NPT x 1¼" NPT, brass	0.4	**27.00**

NA102

GeoGrip™ male adapter.

Code	Description	Lbs	USD
NA10269	1¼" M NPT x 1¼" PE pipe comp.	0.2	**32.00**

PE PIPE CONNECTIONS

NA102

GeoGrip™ manifold outlet connector for joining manifold to polyethylene pipe. (Includes union nut and gasket)

Code	Description	Lbs	USD
NA10246	¾" PE pipe compression	0.8	**54.00**
NA10247	1" PE pipe compression	1.0	**67.00**

863

GeoGrip™ brass sleeve coupling for joining two polyethylene pipes.

Code	Description	Lbs	USD
863027	¾" x ¾" PE pipe compression	0.8	**30.00**
863034	1" x 1" PE pipe compression	1.0	**44.00**

NA863

GeoGrip™ sleeve coupling for joining two polyethylene pipes.

Code	Description	Lbs	USD
NA863042	1¼" x 1¼" PE pipe compression	1.0	**52.00**

NA866

GeoGrip™ elbow coupling for joining two polyethylene pipes.

Code	Description	Lbs	USD
NA866027	¾" x ¾" PE pipe compression	0.1	**26.00**
NA866034	1" x 1" PE pipe compression	0.4	**37.00**
NA866042	1¼" x 1¼" PE pipe compression	0.4	**57.00**

NA102

Metal wrench for tightening 1¼" nuts on GeoGrip™ items NA863042, NA866042, NA10268 and NA10269.

Code	Description	Lbs	USD
NA10264	Tightening wrench	0.2	**360.00**

NA102

Vent cap adapter to connect discharge tube. (Ethanol and methanol systems). Fits onto air vent.

Code	Description	Lbs	USD
NA10204	¼" NPT male x female	0.1	**27.30**

WALL SEALS

NA102

GeoSeal™ wall penetration seals. EPDM w/316 stainless steel hardware. (Priced per pair)

Code	Description	Lbs	USD
NA10248	¾", PE pipe thru 2.5" ID hole	0.5	**100.00**
NA10249	1", PE pipe thru 2.5" ID hole	0.4	**70.00**
NA10265	1¼", PE pipe thru 3" ID hole	0.7	**147.00**

REPLACEMENT PARTS

5020

Automatic air vents fits manifolds.
Brass body.
Hygroscopic safety air vent cap.
Max. working pressure: 150 psi
Max discharge pressure: 60 psi
Max. working temperature: 250°F.

Code	Description	Lbs	USD
502043 CST	½" male thread	0.5	**31.90**

687

Manifold temperature gauge with drywell. -20—120ºF.

Code	Description	Lbs	USD
687000	2½" diameter	0.2	**26.50**

Fill/drain valve with ¾" garden hose connection.

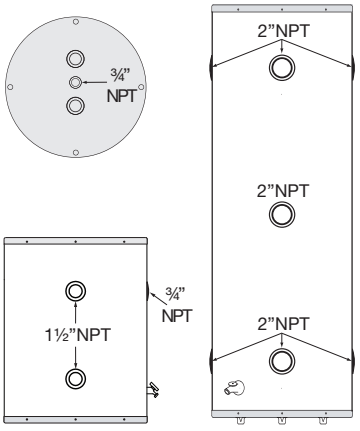
Code	Description	Lbs	USD
538402 FD	½" NPT x ¾" GHT	0.3	**19.40**

STORAGE TANKS

NAS200 ThermoCon™

tech. broch. 01179

Storage tanks can serve as a thermal buffering tank with porcelain glass coated steel lining. Powder-coated steel external cover. Drain port/valve.
Max. working pressure: 150 psi.
Working temperature: -40—190ºF.
Recommended max. delivery water temperature: 120ºF.
Testing pressure: 300 psi.
Tank insulation: 2" non-CFC foam.
Insulation thermal conductivity: R16.
Connections: 25 gal. side: (4) 1½" & (1) ¾" NPT female
25 gal. top: (2) 1½" & (1) ¾" NPT female
50, 80, 120 gal. side: (7) 2" NPT female
50, 80, 120 gal. top: (3) ¾" NPT female



Code	Description	Lbs	USD
NAS20025	25 gal. tank, no HX	100	**2,657.00**
NAS20050	50 gal. tank, no HX	200	**3,176.00**
NAS20080	80 gal. tank, no HX	250	**3,754.00**
NAS20120	119 gal. tank, no HX	350	**4,967.00**

Reduction of Lead in Drinking Water Act Compliant: 0.25% max. weighted average lead content. Reduction of Lead in Drinking Water Act certified through Underwriters Laboratory (UL) in accordance with NSF/ANSI 372.

STORAGE TANK ACCESSORIES

551 DISCALAIR®

tech. broch. 01124

High discharge automatic air vent.
Brass body.
Max. working pressure: 150 psi.
Working temperature range: 32—250ºF.

Code	Description	Lbs	USD
551004A	½" NPT female	8.2	**124.60**

Pipe nipple for attaching air vent to top of storage tank with reducing bushing.

Code	Description	Lbs	USD
NA10160	½" NPT male x ½" male NPT x 3"	0.1	**12.90**

Reducer bushing for inserting into top of storage tank to attach pipe nipple to air vent. 1⅛" hex head.

Code	Description	Lbs	USD
NA10082	¾" M NPT x ½" F NPT, brass	0.3	**8.00**

Magnesium anode rod.

Code	Description	Lbs	USD
NA10229	¾" NPT x 36" anode rod fits 50 gal.	8.0	**64.10**
NA10230	¾" NPT x 40" anode fits 80 &120 gal.	9.0	**89.40**

Reducer bushing for installing into 2" NPT female connection in storage tank providing an ¾" NPT female thread. 1⅝" hex head.

Code	Description	Lbs	USD
NA10234	2" M NPT x ¾" F NPT, low lead brass	0.2	**79.80**

Male plug 1¼" square head.

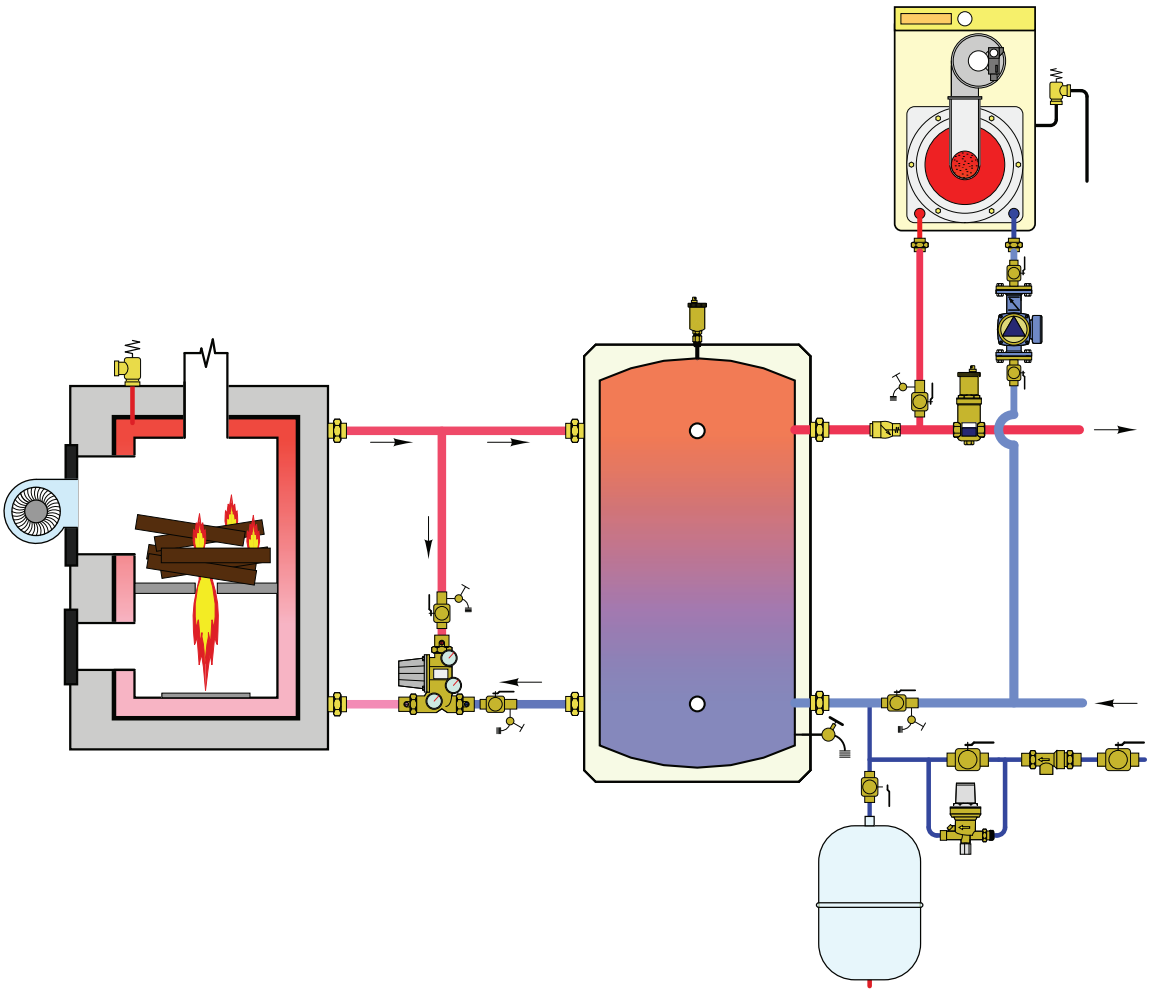
Code	Description	Lbs	USD
NA10339	2" NPT male plug, stainless steel	0.2	**43.40**

Sensor well, ¼" Ø I.D. Insertion length: 1¾".

Code	Description	Lbs	USD
NA15029	Sensor well, ¾" NPT male thread	0.5	**55.70**

BIOMASS COMPONENTS

This diagram is an example



Boiler protection valves, ThermoMix™

Boiler protection recirculation and distribution unit, ThermoBloc™

BOILER PROTECTION HIGH-FLOW THERMOSTATIC MIXING VALVE

PCT INTERNATIONAL APPLICATION PENDING

280 ThermoMix™ NPT

tech. broch. 01223

Boiler protection high-flow thermostatic mixing valve.
Changeable thermostatic sensor cartridge.
Brass body and lower plug.
Max. working pressure: 150 psi.
Working temperature range: 40—212°F.
Thermostatic sensor cartridge:
130°F & 140°F Tset standard selections, see below.
115°F, 160°F Tset optional (field replaceable).
Sensor cartridge accuracy: ±4°F.
By-pass from boiler complete closing temperature: Tset +18°F (ex. 130°+18°=148°F).

Code	Description	Cv	Lbs	USD
280165A	1" NPT 130°F Tset	10	3.6	**422.00**
280166A	1" NPT 140°F Tset	10	3.6	**422.00**
280175A	1¼" NPT 130°F Tset	14	4.5	**485.00**
280176A	1¼" NPT 140°F Tset	14	4.5	**485.00**

PCT INTERNATIONAL APPLICATION PENDING

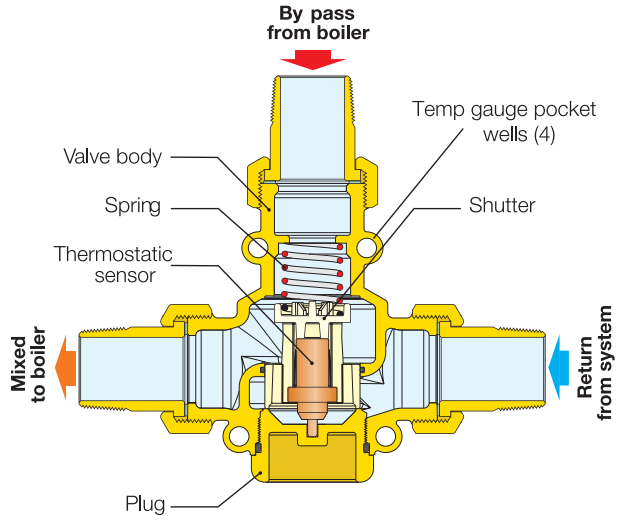
280 ThermoMix™ Sweat

tech. broch. 01223

Boiler protection high-flow thermostatic mixing valve.
Changeable thermostatic sensor cartridge.
Brass body and lower plug.
Max. working pressure: 150 psi.
Working temperature range: 40—212°F.
Thermostatic sensor cartridge:
130°F & 140°F Tset standard selections, see below.
115°F, 160°F Tset optional (field replaceable).
Sensor cartridge accuracy: ±4°F.
By-pass from boiler complete closing temperature: Tset +18°F (ex. 130°+18°=148°F).

Code	Description	Cv	Lbs	USD
280965A	1" sweat 130°F Tset	10	3.6	**395.00**
280966A	1" sweat 140°F Tset	10	3.6	**395.00**
280975A	1¼" sweat 130°F Tset	14	4.5	**465.00**
280976A	1¼" sweat 140°F Tset	14	4.5	**465.00**

Characteristic components



FUNCTION

The ThermoMix™ boiler protection high-flow thermostatic mixing valve is used in hydronic heating systems with non-condensing boilers, including solid fuel, biomass, gas, LP or oil-fired. It can be installed with steel, cast iron and copper tube style boilers, automatically controlling the return water temperature, preventing condensation of the water vapor contained in the flue gas.

The 280 series ThermoMix™ valve mixes by-pass flow from the boiler with return flow from the system, sending a fixed temperature flow to the boiler which protects against corrosion from condensation occurring when a minimum flue gas temperature is not otherwise maintained.

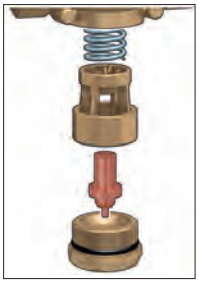
Changeable thermostatic sensor cartridges modifies valve temperature setting. The thermostatic sensor cartridge can easily be removed for maintenance or to change the valve set temperature, with out removing the valve body from the piping.

Thermostatic sensor replacement to modify setting

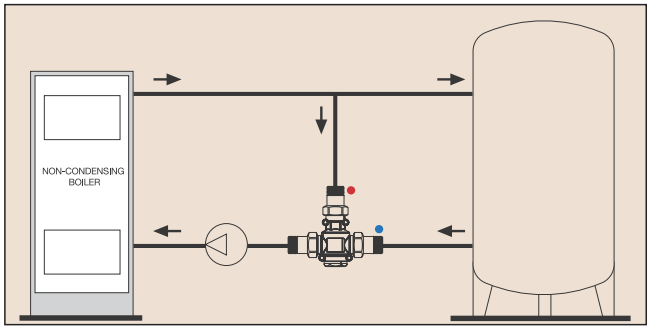
The thermostatic sensor can easily be removed for maintenance or to change the setting, with no need to remove the valve body from the piping.

Installation

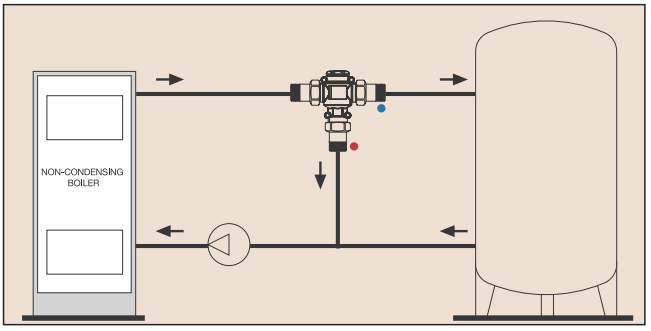
The valve can be installed on both sides of the boiler in any position, vertical or horizontal. Installation is recommended on the return to the boiler in mixing mode; it can also be installed on the flow from the boiler in diverting mode.



Installation in mixing mode (boiler protection)



Installation in diverter mode (system control)



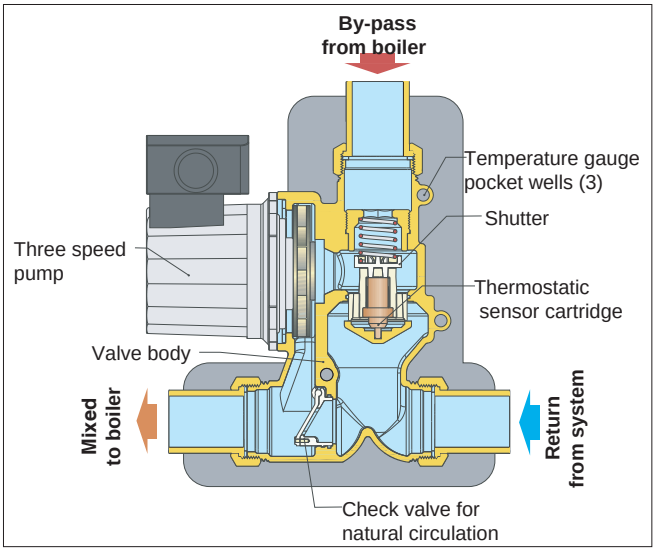
BOILER PROTECTION RECIRCULATION AND DISTRIBUTION UNIT

281 ThermoBloc™ NPT

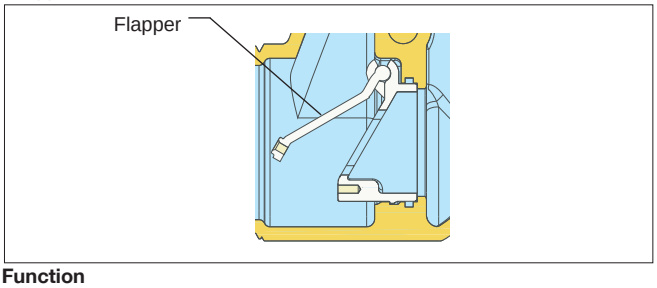
tech. broch. 01224

ThermoBloc™ boiler protection recirculation and distribution unit.
Suitable fluids: water, up to 50% glycol solutions.
Max. working pressure: 150 psi.
Working temperature range: 40—210°F.
Maximum pumping capacity: 10 gpm.
Temperature gauge scale: 30—250°F
Thermostatic sensor:
130°F & 140°F Tset standard selections, see below.
115°F, 160°F Tset optional models*.
Sensor cartridge accuracy: ±4°F.
By-pass from boiler complete closing temperature: Tset +18°F (ex. 130°+18°=148°F).
* Consult factory

Code	Description	Lbs	USD
281165A	1" NPT 130°F Tset	11	**1,300.00**
281166A	1" NPT 140°F Tset	11	**1,300.00**
281175A	1¼" NPT 130°F Tset	11	**1,495.00**
281176A	1¼" NPT 140°F Tset	11	**1,495.00**



Flapper check valve



Function

The flapper check valve allows the natural thermosyphon circulation of the system heat transfer fluid when the pump stops running due to power failure. When the pump is running under normal conditions the thrust of the flowing medium keeps the flapper closed, forcing flow past the thermostatic sensor. When the pump stops running and the fluid in the boiler is at high temperature, natural circulation begins, by-passing the thermostatic sensor, preventing over heating in the boiler.

281 ThermoBloc™ Sweat

tech. broch. 01224

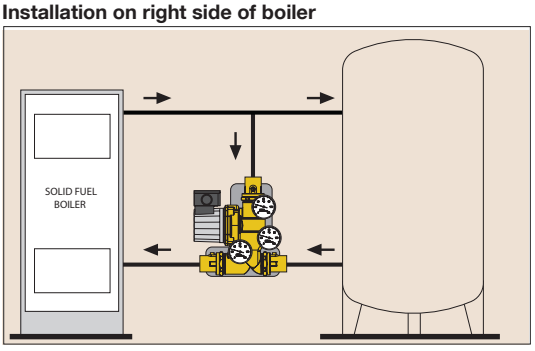
ThermoBloc™ boiler protection recirculation and distribution unit.
Suitable fluids: water, up to 50% glycol solutions.
Max. working pressure: 150 psi.
Working temperature range: 40—210°F.
Maximum pumping capacity: 10 gpm.
Temperature gauge scale: 30—250°F
Thermostatic sensor:
130°F & 140°F Tset standard selections, see below.
115°F, 160°F Tset optional models*.
Sensor cartridge accuracy: ±4°F.
By-pass from boiler complete closing temperature: Tset +18°F (ex. 130°+18°=148°F).
* Consult factory

Code	Description	Lbs	USD
281965A	1" sweat 130°F Tset	11	**1,215.00**
281966A	1" sweat 140°F Tset	11	**1,215.00**
281975A	1¼" sweat 130°F Tset	11	**1,430.00**
281976A	1¼" sweat 140°F Tset	11	**1,430.00**
F19379	Replacement Pump	5	**515.00**

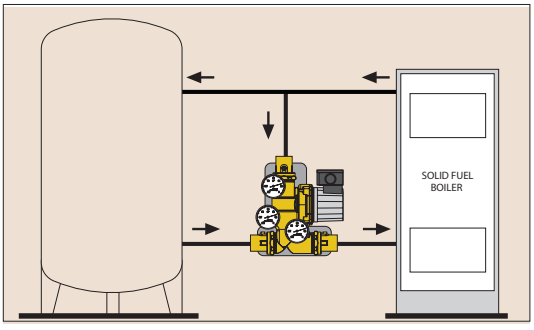
Function

The ThermoBloc™ boiler protection recirculation and distribution unit is used in hydronic heating systems with non-condensing boilers, including solid fuel, biomass, gas LP or oil-fired. It can be installed with steel, cast iron and copper tube style boilers, automatically controlling the return water temperature, protection against corrosion from condensation occurring when a minimum flue gas temperature is not otherwise maintained.
The ThermoBloc™ unit is compact for easy installation, reducing required space and fittings. It combines the functionality of a boiler protection valve with a circulation pump and a unique flapper check valve allowing for thermosyphon flow between the boiler and distribution system during a power outage. The ThermoBloc™ includes three temperature gauges and is encased in an insulation shell.

Installation on right side of boiler



Installation on left side of boiler



F296

Replacement thermostatic sensor cartridges.
Sensor cartridge accuracy: ±4ºF.
By-pass from boiler complete closing temperature: Tset +18ºF (130°+18°=148°F).

Fits 280 and 281 series boiler protection valves.
Easy replacement to change the 280 valve set temperature without removing the valve body from the piping.

Code	Description	Lbs	USD
F29633	115ºF Tset	0.2	**40.00**
F29634	130ºF Tset	0.2	**40.00**
F29635	140ºF Tset	0.2	**40.00**
F29636	160ºF Tset	0.2	**40.00**

Selection note: thermostatic sensor cartridge will completely close at Tset value +18°F. Example: (130°F Tset +18°F=148°F completely closed) ±4ºF.

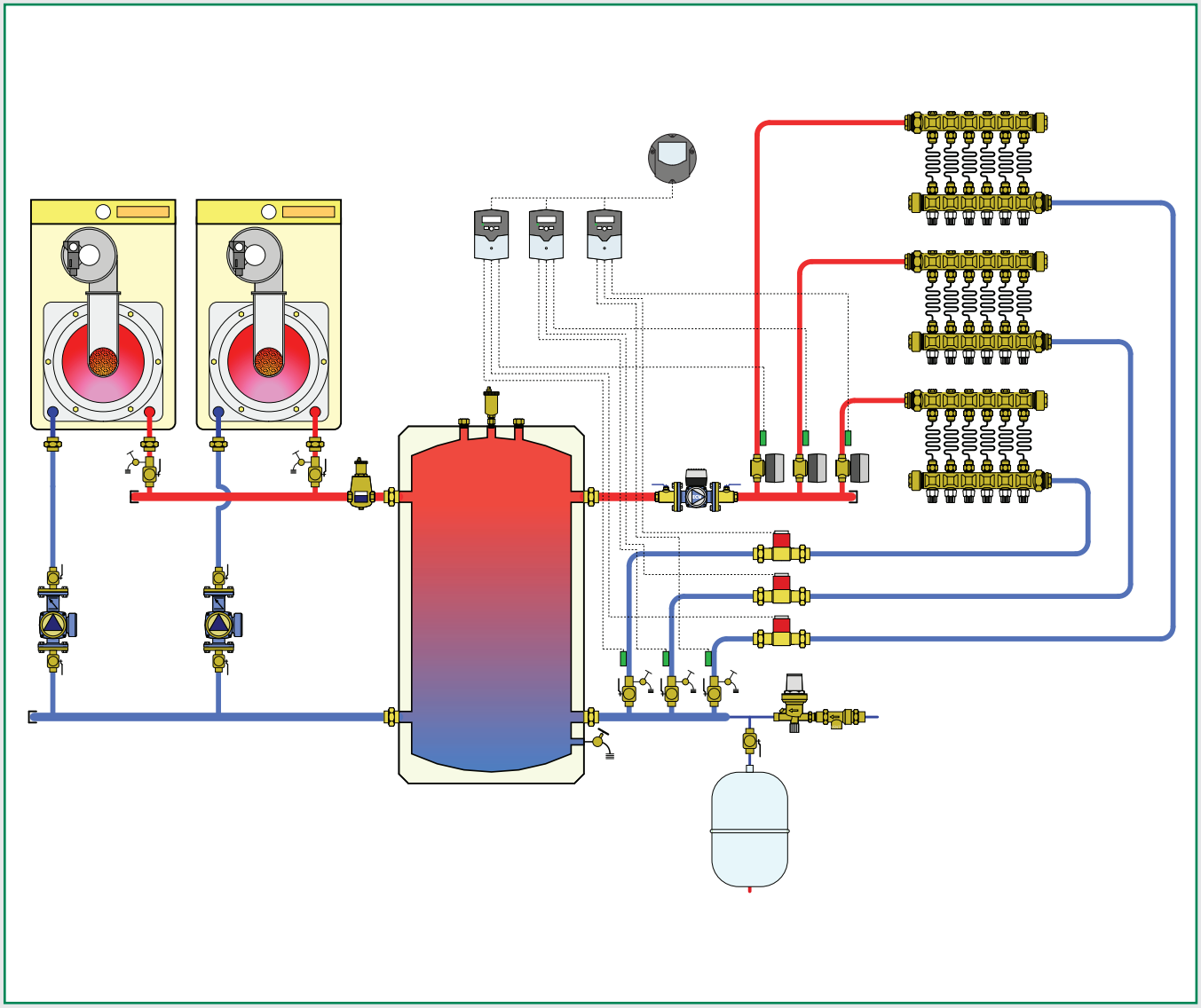
F295

Dual scale temperature gauge 280 and 281 series boiler protection valves.

Code	Description	Lbs	USD
F29571	32—250ºF	0.2	**34.00**

HEAT METERS

This diagram is an example



WMZ heat meters

HEAT METERS

257 WMZ

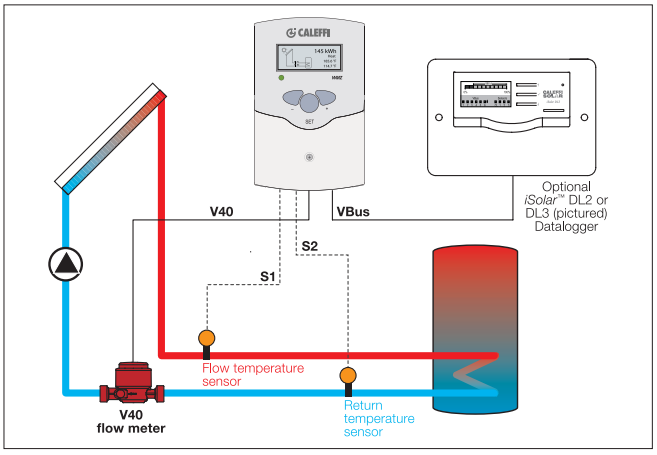
tech. broch. 01275

WMZ intelligent kWh energy heat meter with data connection.
Inputs: rotary pulse flow meter and two Pt1000 supply and return temperature sensors purchased separately.
Temp. measurement range: -20°—300°F.
Adj. temp. sensor offset: ± 0.9°F (0.5°K).
Measuring precision: ± 0.5°F (0.3°K).
Volume concentration of glycol: 0—70%.
Pulse rate volumetric flow rate: 1—99 l/imp.
Interface: VBus.
Power supply: 24 V AC/DC

Code	Description	Lbs	USD
257202A	Energy heat meter	2.0	**688.00**

Function

The WMZ is a heat meter for solar thermal systems and conventional heating (or cooling) systems. The WMZ calculates heat by integrating flow rate from a rotary pulse flow meter and temperature difference in the supply and return piping using two Pt1000 temperature sensors for convenient metering of energy generated or consumed. The calculated heat energy value is displayed in kWh (kilowatt hours) and stored. Memory protection guarantees that the adjusted system settings and the calculated heat energy quantity are maintained in the case of power loss.



Multi node network

Additional WMZ energy meters can be cascaded together on the VBus connection. One WMZ is configured as the master and additional WMZ meters are configured as slaves. Up to 16 meters can be cascaded together with two conductor wire (bell wire) at least 20 AWG and up to 150 feet for transmission of data values to a connected PC or DL datalogger.

Sensor well, ¼" Ø I.D. fits Pt1000 temperature sensors 257205 and 257206 Insertion length 1¾".

Code	Description	Lbs	USD
NA10090	Sensor well, ½" NPT male thread	0.5	**36.40**
NA15029	Sensor well, ¾" NPT male thread	0.5	**55.70**

V40

tech. broch. 01275

Single jet rotary pulse flow meter measures liquid flow for energy heat metering production or consumption. Accurate to International Standards OIML R75, EN1434 and MID.
Brass body.
Sweat connections included.
Working temperature range: -40°—210°F.
Max. fluid temperature: 265°F
Max. working pressure: 235 psi.
Maximum glycol: 50%.

Code	Description	Lbs	USD
NA79701	¼—10 gpm, ¾" sweat	3.0	**685.00**

V40

tech. broch. 01275

Multi-jet rotary pulse flow meter measures liquid flow for energy heat metering production or consumption. Accurate to International Standards OIML R75, EN1434 and MID.
Brass body.
Sweat connections included.
Working temperature range: -40°—210°F.
Max. fluid temperature: 265°F
Max. working pressure: 235 psi.
Maximum glycol: 50%.

Code	Description	Lbs	USD
NA79702	½—15 gpm, 1" sweat	5	**1,210.00**
NA79703	½—25 gpm, 1¼" sweat	8	**1,420.00**
NA79704	1—45 gpm, 1½" sweat	14	**1,735.00**
NA79705	1½—65 gpm, 2" sweat	17	**2,500.00**

FKP6 collector Pt1000 sensor with 5' black UV cable, Platinum RTD type, 1000 Ohm, -58—355°F, ¼" Ø O.D.

Code	Description	Lbs	USD
257205	Black collector sensor	0.2	**62.00**

FRP6 storage tank Pt1000 sensor with 8' gray cable, Platinum RTD type, 1000 Ohm, 15—200°F, ¼" Ø O.D.

Code	Description	Lbs	USD
257206	Gray storage sensor	0.2	**57.80**

FKP9 collector screw mount Pt1000 sensor with 5' black cable, Platinum RTD type, 1000 Ohm, -58—355°F, ¼" Ø O.D.

Code	Description	Lbs	USD
257207	Black collector sensor	0.2	**93.50**

HEAT METERS

257 WMZ-G1

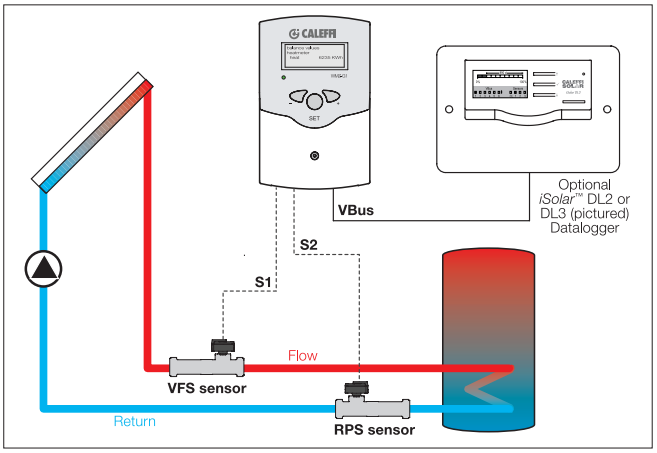
tech. broch. 01272

WMZ-G1 intelligent kWh energy heat meter with VBus data connection. Requires VFS and RPS sensors purchased separately.
Temperature measurement range: 32—210°F.
Pressure measuring range: 0—150 psi.
Inputs: 2 Grundfos Direct analog sensors.
Alarm relay capacities: 1 A 24 V AC/DC
Interface: VBus data connection.
Power supply: 24 V AC/DC.

Code	Description	Lbs	USD
257202A G1	Energy heat meter	2.0	**688.00**

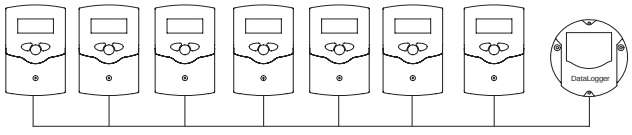
Function

The WMZ-G1 is a energy heat meter for solar thermal systems and conventional heating or cooling systems. The WMZ-G1 calculates heat by integrating flow rate from a Grundfos Vortex Flow Sensor (VFS) and temperature difference in the supply and return piping using either Grundfos Relative Pressure Sensor (RPS) or VFS sensors. The calculated heat energy value is displayed in kWh (kilowatt hours) and stored. Memory protection guarantees that the adjusted system settings and the calculated heat energy quantity are maintained in the case of power loss.



Multi node network

Additional WMZ-G1 energy meters can be cascaded together on the VBus connection. One WMZ-G1 is configured as the master and additional WMZ-G1 meters are configured as slaves. Up to 16 meters can be cascaded together with two conductor wire (bell wire) at least 20 AWG and up to 150 feet for transmission of data values to a connected PC or DL datalogger.



The connection sequence is arbitrary, up to 16 can be cascaded together.

NA150

tech. broch. 01272

Cable for connecting Grundfos VFS & RPS (molded plug) to WMZ-G1 terminal block (4 wire pins).

Code	Description	Lbs	USD
NA15030	VFS & RPS cable, 10' length	0.1	**26.30**

RPS Grundfos analog pressure/ temperature sensor. Requires NA15030 cable.
Pressure measuring range: 0—150 psi.
Temperature measurement range: 32—210°F.
Max. fluid temperature: 250°F
Maximum Glycol: 50%.
Connection: ½" male NPT.

Code	Description	Lbs	USD
NA15010	RPS 0—10, 0—150 psi	0.3	**198.50**

RPS Grundfos analog pressure / temperature sensor. In-line body. Requires NA15030 cable.
Pressure measuring range: 0—150 psi.
Temperature measurement range: 32—210°F.
Max. fluid temperature: 250°F
Maximum Glycol: 50%.
Connection: 1" male union thread.
Select union fittings on page 72.

Code	Description	Lbs	USD
NA15014	RPS 0—10, 0—150 psi	0.6	**243.80**

VFS Grundfos analog flow / temperature sensor. Requires NA15030 cable.
Temperature measurement range: 32—210°F.
Max. fluid temperature: 250°F
Flow measurement accuracy: 1.5%
Flow response time: < 1 sec.
Brass or stainless in-line body.
Maximum glycol: 50%.
Connection: 1" male union thread.
Select union fittings on page 72.
Flow measurement accuracy: 1.5%
Flow response time: <1 sec.

Code	Description	Lbs	USD
NA15015	VFS 1-12, ¼—3 gpm	0.6	**334.50**
NA15016	VFS 2-40, ½—10 gpm	0.6	**368.60**
NA15017	VFS 5-100, 1½—15 gpm	1.6	**641.00**

VFS Grundfos analog flow / temperature sensor. Requires NA15030 cable.
Temperature measurement range: 32—210°F.
Max. fluid temperature: 250°F
Flow measurement accuracy: 1.5%
Flow response time: < 1 sec.
Composite in—line body.
Sweat unions included.
Maximum glycol: 50%.
Flow measurement accuracy: 1.5%
Flow response time: <1 sec.

Code	Description	Lbs	USD
NA15018	VFS 10-200, 2½—20 gpm, 1" sweat	1.7	**907.00**
NA15019	VFS 20-400, 5—45 gpm, 1¼" sweat	3.8	**1,361.00**

Code	USD	Page(s)
100001A	21.00	72
110050A	41.00	105
110060A	45.00	105
1107B5LA	1,260.00	104
1107B5RA	1,260.00	104
1107C5LA	1,390.00	104
1107C5RA	1,390.00	104
1107D5LA	1,530.00	104
1107D5RA	1,530.00	104
1107E5LA	1,660.00	104
1107E5RA	1,660.00	104
1107F5LA	1,790.00	104
1107F5RA	1,790.00	104
1107G5LA	1,950.00	104
1107G5RA	1,950.00	104
1107H5LA	2,080.00	104
1107H5RA	2,080.00	104
111001	49.00	105
111003	51.00	105
112001	52.00	105
112003	54.00	105
120141A 000	167.90	72
120149A 000	159.90	72
120151A 000	170.10	72
120159A 000	162.00	72
120161A 000	335.80	72
120169A 000	319.70	72
120171A 000	382.00	72
120179A 000	363.80	72
120341A 000	181.80	72
120349A 000	173.10	72
120351A 000	184.00	72
120359A 000	175.20	72
120361A 000	349.70	72
120369A 000	333.00	72
120371A 000	396.00	72
120379A 000	377.10	72
121141A	185.20	67
121149A	176.40	67
121151A	187.40	67
121159A	178.50	67
121161A	382.00	67
121169A	363.80	67
121171A	428.40	67
121179A	407.90	67
121341A	198.50	67
121349A	189.60	67
121351A	201.30	67
121359A	191.70	67
121361A	395.90	67
121369A	377.10	67
121371A	442.30	67
121379A	421.20	67
127341AF	133.80	66
127346AF	148.00	66
127349AF	127.40	66
127351AF	139.00	66
127356AF	161.90	66
127359AF	133.10	66
127361AF	160.40	66
127366AF	200.40	66
127369AF	152.80	66
130400A	185.00	68
130500A	200.00	68
130600A	240.00	68
130700A	300.00	68
130800A	375.00	68
130900A	500.00	68
132432A	260.70	70
132438AFC	365.70	58,71
132439AFC	311.10	58,71
132458AFC	365.70	58,71
132459AFC	311.00	58,71
132536AFC	373.80	58,71
132537AFC	430.50	58,71
132538AFC	389.30	58,71
132539AFC	334.80	58,71
132552A	280.80	70,105
132556AFC	373.80	58,71
132557AFC	430.50	58,71
132558AFC	389.30	58,71
132559AFC	334.80	58,71
132638AFC	439.80	58,71
132639AFC	386.30	58,71
132658AFC	439.80	58,71
132659AFC	386.30	58,71
132662A	327.40	70,105
132772A	434.40	70,105
132882A	514.60	70,105
132992A	631.40	70,105
142241A	155.00	69
142251A	165.00	69
142261A	225.00	69
142271A	320.00	69
142281A	360.00	69
142291A	460.00	69
163600A	1,890.00	38
163610A	1,890.00	38
165001	79.20	38
165600A	1,420.00	38
165602A	1,735.00	38
165610A	1,420.00	38
165612A	1,735.00	38
166600A	1,735.00	39
166602A	2,050.00	39
166610A	1,735.00	39
166612A	2,050.00	39
167600A	2,050.00	39
167602A	2,365.00	39
167610A	2,050.00	39
167612A	2,365.00	39
1715C1A	2,011.00	40
1715C1AHE	2,326.00	40
1715D1A	2,112.00	40
1715D1AHE	2,427.00	40
1715E1A	2,214.00	40
1715E1AHE	2,529.00	40
1715F1A	2,316.00	40
1715F1AHE	2,631.00	40
1715G1A	2,417.00	40
1715G1AHE	2,732.00	40
1715H1A	2,519.00	40
1715H1AHE	2,834.00	40
1715I1A	2,621.00	40
1715I1AHE	2,936.00	40
1715L1A	2,722.00	40
1715L1AHE	3,037.00	40
1715M1A	2,824.00	40
1715M1AHE	3,139.00	40
1715N1A	2,926.00	40
1715N1AHE	3,241.00	40
1715O1A	3,027.00	40
1715O1AHE	3,342.00	40
1725C1A	1,654.80	41
1725C1AHE	1,985.55	41
1725D1A	1,761.90	41
1725D1AHE	2,092.65	41
1725E1A	1,867.95	41
1725E1AHE	2,198.70	41
1725F1A	1,975.05	41
1725F1AHE	2,305.80	41
1725G1A	2,082.15	41
1725G1AHE	2,412.90	41
1725H1A	2,188.20	41
1725H1AHE	2,518.95	41
1725I1A	2,295.30	41
1725I1AHE	2,626.05	41
1725L1A	2,402.40	41
1725L1AHE	2,733.15	41
1725M1A	2,508.45	41
1725M1AHE	2,839.20	41
1725N1A	2,615.55	41
1725N1AHE	2,946.30	41
1725O1A	2,721.60	41
1725O1AHE	3,052.35	41
200000	76.20	24
201000	136.50	24
203502	258.30	24
209000	26.30	24
209001	10.50	24
220400A	74.60	25
220500A	81.90	25
221400A	74.60	25
221500A	81.90	25
250041A	78.80	90
251003A	208.80	91
251004A	157.30	90
252149A	252.90	91
252158A	327.40	91
252159A	266.50	91
252168A	372.50	91
252169A	308.70	91
253040	78.50	91
253042	78.50	91
253043	78.50	91
253044	78.50	91
253046	78.50	91
253048	78.50	91
254452	31.80	93
254752	36.30	93
255007	200.00	85
255010A	336.00	85
257201A	1,056.00	102
257202A	688.00	114
257202A G1	688.00	115
257204A	1,890.00	102
257205	62.00	101,114
257206	57.80	101,114
257207	93.50	101,114
257208	31.50	96
257220A	500.00	96
257260A	760.00	96
257260A PV1	760.00	96
257260A PV2	760.00	96
257270A	1,025.00	98
257280A LTE	1,260.00	100
259012	171.90	85
259018	213.50	85
259025	276.40	85
259033	471.90	85
259050	595.00	85
278011	64.00	86
278751	882.00	86
278751A	1,145.00	86
278951A	1,223.00	87
279051	1,050.00	86
279051A	1,313.00	86
280165A	422.00	110
280166A	422.00	110
280175A	485.00	110
280176A	485.00	110
280965A	395.00	110
280966A	395.00	110
280975A	465.00	110
280976A	465.00	110
281165A	1,300.00	111
281166A	1,300.00	111
281175A	1,495.00	111
281176A	1,495.00	111
281965A	1,215.00	111
281966A	1,215.00	111
281975A	1,430.00	111
281976A	1,430.00	111
301040	63.00	27
301140	63.00	27
301241	110.30	27
301341	110.30	27
31401 FD	50.90	77

Code	USD	Page(s)
31403 FD	84.00	77
31426 FD	100.60	77
31428FD	130.10	77
31553FD	22.50	77
31554 FD	45.20	76,77
31901A	15.60	75,94
31970A	18.00	77
337221A	13.70	11
338452	78.50	26
339452	84.60	26
342452	51.70	26
343452	54.20	26
386500	12.40	47
387100	59.40	47
387127	110.00	25
41371A	73.50	76
41372A	94.50	76
41380A	18.00	77
41787 CST	52.50	76
41788 CST	70.40	76
41789 CST	91.40	76
41882A	79.40	77
437516	10.70	28
449000	12.50	49
449010	15.80	24
449740	5.50	27
472000	260.20	24
501502A	404.30	7,10
502015A	22.60	10
502043 CST	31.90	49,106
502043A	31.90	7,10
502115A	30.50	10
502243A	54.80	10
502343A	64.70	7,10
502610A	20.30	11
502620A	21.20	11
502640	30.50	11
502710A	28.10	11
502720A	29.70	11
508013A	11.10	11
508100A	9.60	11
519006	89.30	39
519502A	168.30	8
519566A	190.30	8
519599A	166.00	8
519600A	261.10	8
519609A	261.10	8
519700A	313.40	8
519709A	313.40	8
521101A	192.70	53
521342A	271.00	55
521349A	259.20	55
521352A	282.80	55
521359A	271.00	55
521362A	335.80	55
521369A	323.80	55
521400A	259.50	52
521400AC	284.90	52
521406A	264.70	53
521409A	248.20	52
521409AC	273.60	52
521410A	305.70	52
521410AC	331.10	52
521416A	310.90	53
521419A	294.40	52
521419AC	319.80	52
521500A	270.80	52
521500AC	307.90	52
521506A	271.40	53
521506AC	325.70	53
521509A	259.50	52
521509AC	296.60	52
521510A	317.00	52
521510AC	353.90	52
521516A	317.60	53
521516AC	381.00	53
521519A	305.70	52
521519AC	342.60	52
521600A	321.60	52
521600AC	358.70	52
521606A	327.70	53
521609A	309.10	52
521609AC	346.20	52
521610A	364.50	52
521610AC	401.40	52
521616A	370.60	53
521619A	352.00	52
521619AC	388.90	52
523005	685.00	55
523006	966.00	55
523008	1,657.00	55
523160A	1,372.00	54
523168A	1,276.00	54
523170A	1,570.00	54
523177A	1,583.00	54
523178A	1,495.00	54
523179A	1,266.00	54
523180A	2,177.00	54
523188A	2,102.00	54
523190A	2,492.00	54
523198A	2,416.00	54
523199A	1,936.00	54
535004	73.50	63
535051A	201.30	63
535056A	207.00	63
535059A	199.00	63
535066A	224.50	63
535340HA	182.00	56
535341HA	200.00	56
535350HA	196.00	56
535351HA	214.00	56
535360HA	256.00	56
535361HA	274.00	56
535370HA	544.00	56
535371HA	562.00	56
535650HA	218.00	56
535651HA	236.00	56
535940HA	167.00	56
535941HA	185.00	56
535950HA	181.00	56
535951HA	199.00	56
535960HA	240.00	56
535961HA	258.00	56
535970HA	530.00	56
535971HA	548.00	56
538202 FD	19.00	8,72
538402 FD	19.40	7,8,18,72,106
546016A	486.00	16
546050A	3,651.00	16
546060A	3,848.00	16
546080A	4,956.00	16
546096A	463.00	16
546097A	552.00	16
546100A	5,433.00	16
546108A	1,680.00	16
546109A	1,775.00	16
546116A	578.00	16
546120A	7,837.00	16
546150A	9,562.00	16
546168A	1,780.00	16
546169A	1,985.00	16
546195A	486.50	16
546196A	554.00	16
546197A	659.00	16
546198A	1,633.00	16
546199A	1,711.00	16
546205A	243.50	18
546206A	269.20	18
546207A	392.20	18
546208A	508.00	18
546209A	624.00	18
546228A	256.40	18
546235A	373.50	18
546241A	483.60	18
546254A	595.00	18
546266A	309.20	18
546267A	476.20	18
546306A	324.00	18
546307A	473.10	18
546308A	616.00	18
546309A	743.00	18
546328A	308.60	18
546335A	450.60	18
546341A	587.00	18
546354A	716.00	18
546366A	351.50	18
546367A	538.90	18
546510A	3,128.00	20
546510AM	3,910.00	21
546550A	1,944.00	20
546550AM	2,430.00	21
546560A	2,091.00	20
546560AM	2,614.00	21
546580A	2,828.00	20
546580AM	3,535.00	21
548006A	1,010.00	5
548007A	1,217.00	5
548008A	1,594.00	5
548009A	1,860.00	5
548052A	3,696.00	5
548062A	3,938.00	5
548082A	4,925.00	5
548066A	1,090.00	5
548067A	1,385.00	5
548068A	1,794.00	5
548069A	2,280.00	5
548096A	961.00	5
548097A	1,160.00	5
548098A	1,518.00	5
548099A	1,772.00	5
548102A	5,513.00	5
549052A	4,662.00	4
549062A	4,967.00	4
549082A	6,216.00	4
549102A	6,962.00	4
549506A	1,375.00	4
549507A	1,665.00	4
549508A	2,185.00	4
549509A	2,545.00	4
549566A	1,455.00	4
549567A	1,833.00	4
549568A	2,385.00	4
549569A	2,965.00	4
549596A	1,315.00	4
549597A	1,585.00	4
549598A	2,080.00	4
549599A	2,425.00	4
551003A	157.90	14
551003AC	167.70	14
551004A	124.60	11,107
551005A	261.00	13
551005AC	270.80	13
551006A	288.30	13
551006AC	298.10	13
551007A	421.10	13
551007AC	430.90	13
551008A	548.00	13
551008AC	557.80	13
551009A	669.00	13
551009AC	678.80	13
551022A	152.40	14
551022AC	162.20	14
551028A	274.70	13
551028AC	284.50	13
551035A	401.00	13
551035AC	410.80	13
551041A	522.00	13
551041AC	531.80	13

Code	USD	Page(s)
551050A	2,875.00	15
551054A	637.00	13
551054AC	646.80	13
551060A	3,074.00	15
551066A	328.30	13
551066AC	338.10	13
551067A	505.10	13
551067AC	514.90	13
551080A	4,069.00	15
551100A	4,552.00	15
551120A	6,625.00	15
551150A	8,536.00	15
553542A	155.50	62
553549A	148.20	62
553642A	175.50	62
553649A	168.20	62
559920A	1,195.00	6
559921A	1,229.00	6
559922A	1,468.00	6
559931A	1,765.00	6
561402A	19.50	11,13
562100	25.40	22
573002A	266.90	62
573009A	254.20	62
573012A	286.90	62
573019A	274.20	62
573403A	121.30	62
573409A	115.60	62
573493A	118.60	62
573503A	127.40	62
586600	15.40	79
59474A	15.80	11
59756	199.80	22
59804A	16.90	11
59817A	26.90	75
59829	154.50	22
59834A	25.20	75,94
59840A	39.50	75
59893A	34.80	75
59894A	64.80	75
59904A	32.40	75
59905A	38.20	75
59906A	62.50	75
61215A	27.30	79,95
626009	30.50	8
626600A	325.40	8
644004	329.30	36
644240A	418.30	36
644246A	433.00	36
644249A	411.50	36
644250A	432.10	36
644256A	454.10	36
644259A	425.10	36
644260A	459.50	36
644266A	499.50	36
644269A	452.70	36
644340A	452.70	36
644340A 3BY	452.70	36
644346A	475.20	36
644346A 3BY	475.20	36
644349A	445.70	36
644349A 3BY	445.70	36
644350A	466.30	36
644350A 3BY	466.30	36
644356A	499.30	36
644356A 3BY	499.30	36
644359A	459.50	36
644359A 3BY	459.50	36
644360A	493.70	36
644360A 3BY	493.70	36
644366A	553.70	36
644366A 3BY	553.70	36
644369A	487.00	36
644369A 3BY	487.00	36
656304	137.70	48
656314	163.40	30,48
656314R	178.10	48
656404	103.30	24,48
656414	129.20	24,30,48
659044	403.30	46
659064	438.80	46
659084	517.00	46
659104	595.00	46
659124	672.00	46
6636C5A	625.00	44
6636D5A	722.00	44
6636E5A	819.00	44
6636F5A	916.00	44
6636G5A	1,013.00	44
6636H5A	1,111.00	44
6636I5A	1,208.00	44
6636L5A	1,305.00	44
6636M5A	1,402.00	44
6636N5A	1,499.00	44
6636O5A	1,596.00	44
6636P5A	1,875.00	44
6637C5A	666.00	44
6637D5A	762.00	44
6637E5A	859.00	44
6637F5A	957.00	44
6637G5A	1,054.00	44
6637H5A	1,151.00	44
6637I5A	1,248.00	44
6637L5A	1,345.00	44
6637M5A	1,442.00	44
6637N5A	1,540.00	44
6637O5A	1,637.00	44
6637P5A	1,923.00	44
668000	117.80	48
6686C5S1A	764.00	42
6686D5S1A	875.00	42
6686E5S1A	986.00	42
6686F5S1A	1,097.00	42
6686G5S1A	1,208.00	42
6686H5S1A	1,319.00	42
6686I5S1A	1,430.00	42
6686L5S1A	1,541.00	42
6686M5S1A	1,652.00	42
6686N5S1A	1,763.00	42
6686O5S1A	1,875.00	42
6687C5S1A	810.00	42
6687D5S1A	921.00	42
6687E5S1A	1,033.00	42
6687F5S1A	1,142.00	42
6687G5S1A	1,254.00	42
6687H5S1A	1,365.00	42
6687I5S1A	1,476.00	42
6687L5S1A	1,587.00	42
6687M5S1A	1,698.00	42
6687N5S1A	1,809.00	42
6687O5S1A	1,920.00	42
669050	42.80	49
675900A	13.50	49
676046A	76.20	30
676049A	58.20	30
676056A	84.50	30
676059A	72.30	30
676066A	130.60	30
676069A	86.30	30
676246A	247.70	30
676249A	221.60	30
676256A	247.90	30
676259A	235.70	30
676266A	302.20	30
676269A	249.70	30
676346A	211.80	30
676349A	187.40	30
676356A	213.70	30
676359A	201.50	30
676366A	266.30	30
676369A	215.50	30
680503A	12.40	47
680504A	12.40	47
680505A	12.40	47
680507	12.40	47
680555A	12.40	47
681503A	13.00	28
681524	13.00	28
681555	13.00	28
682530A	12.80	47
682540A	12.80	28,47
682545A	13.80	47
682550A	24.40	47
687000	26.50	106
688003A	50.30	8,49,53,54
69122 CST	16.20	49
69184	25.30	49
694045	24.60	7
861527A CST	25.00	105
861634A CST	40.00	105
863027	30.00	106
863034	44.00	106
940451	23.60	28
942550	15.50	47
CBN130400A	40.70	68
CBN130500A	44.00	68
CBN130600A	52.80	68
CBN130700A	66.00	68
CBN130800A	82.50	68
CBN130900A	110.00	68
CBN142241A	37.20	69
CBN142251A	39.60	69
CBN142261A	54.00	69
CBN142271A	76.80	69
CBN142281A	86.40	69
CBN546002	115.50	16
CBN546205	73.50	18
CBN546207	78.80	18
CBN546209	86.10	18
CBN551005	73.50	13
CBN551007	78.80	13
CBN551009	86.10	13
F11344	5.00	8,49
F19149	420.00	58
F19346	51.20	70,71,105
F19379	515.00	111
F29571	34.00	112
F29633	40.00	112
F29634	40.00	112
F29635	40.00	112
F29636	40.00	112
F29758	50.50	86
F29759	50.50	86
F31868	15.10	77,93
F36073	10.50	25
F39807	75.60	22
F41186	4.50	77,78
F50055	2.10	7,75,93
F52429	5.00	53
F59650	45.90	62
F61008	5.70	75,93
F61008/C	6.80	75,93
F67037	1.15	8,49
F69293	21.90	33
F69294	21.90	33
F69590	29.00	49
F69600	36.30	49
NA10001	12.50	77,93
NA10002	12.50	75,94
NA10003	14.50	75,94
NA10005	10.80	31
NA10006	13.50	31
NA10007	22.20	31
NA10009	57.00	76
NA10038	323.40	45
NA10042	29.50	95
NA10056	81.10	53
NA10058	89.00	53

Code	USD	Page(s)
NA10060	27.30	78,94
NA10061	28.50	78,94
NA10062	29.50	78,94
NA10064	30.70	78,94
NA10082	8.00	84,107
NA10083	17.00	79
NA10085	26.10	94
NA10087	27.50	79,95
NA10089	22.70	79,94
NA10090	36.40	101,114
NA10092	9.50	98,100
NA10093	64.60	84
NA10100	100.00 net	82
NA10103	252.80	90
NA10104	4.50	79
NA10114	29.50	95
NA10116	44.80	95
NA10118	27.30	78,93
NA10119	37.50	79,95
NA10120	73.50	96
NA10126	100.00 net	82
NA10160	12.90	107
NA10164	32.40	75
NA10165	38.20	75
NA10166	62.50	75
NA10197	2.10	62
NA10204	27.30	22,90,106
NA10229	64.10	84,107
NA10230	89.40	84,107
NA10234	79.80	84,107
NA10236	21.40	79
NA10246	54.00	106
NA10247	67.00	106
NA10248	100.00	106
NA10249	70.00	106
NA10262	13.90	28,47
NA10263	27.00	105
NA10264	360.00	106
NA10265	147.00	106
NA10268	205.00	105
NA10269	32.00	105
NA10271	4.20	78,81
NA10272	52.50	78,81
NA10273	16.20	63
NA10288	53.30	105
NA10295	109.50	8
NA10296	118.50	8
NA10302	3.20	75,79,82,94
NA10313	15.00	28,47
NA10315	178.90	53
NA10328	73.80	53
NA10339	43.40	84,107
NA10342	15.00	34
NA10343	90.00	35
NA10354	68.60	8
NA10355	82.60	8
NA10358	90.50	53
NA10363	20.00	62
NA10366	78.80	54
NA10367	194.30	54
NA10403	28.20	75
NA10404	43.10	75
NA10405	4.20	53
NA10406	58.30	77
NA10407	87.50	77
NA10408	123.00	77
NA10409	200.00	77
NA10419	51.50	75
NA10419C	55.70	75
NA11304	21.50	56
NA11305	23.70	56
NA11306	25.50	56
NA11307	27.50	56
NA12102	39.90	92
NA12103	53.80	92
NA12104	86.10	92
NA12112	3.70	93
NA12113	5.70	93
NA12114	9.10	95
NA12122	27.30	78,93
NA12123	34.10	78,93
NA12124	54.60	79,95
NA12132	48.20	92
NA12133	50.70	92
NA12134	57.10	92
NA12145	41.60	82
NA12146	103.10	82
NA12147	141.30	82
NA12152	29.20	78,93
NA12153	50.70	74
NA12154	55.80	74
NA12155	79.40	74
NA12156	48.80	89
NA12162	31.60	79,94
NA12168	340.00	86
NA12169	540.00	89
NA12170	340.00	86
NA12171	420.00	87
NA12172	27.30	78,93
NA12173	34.10	78,93
NA12240	42.80	72,74,88,99
NA12246	48.00	31,74
NA12249	40.50	72,74,88,99
NA12250	46.80	72,74,88,99
NA12256	52.50	31,74
NA12259	44.50	72,74,88,99
NA12260	56.90	72,74,88,99
NA12266	70.00	31,74
NA12269	54.60	72,74,88,99
NA12340	64.30	74
NA12346	72.00	31,74
NA12349	60.80	74
NA12350	70.20	74
NA12356	78.75	31,74
NA12359	66.80	74
NA12360	85.40	74
NA12366	105.00	31,74
NA12369	81.90	74
NA15006	80.85	97
NA15008	754.00	97
NA15010	198.50	99,115
NA15012	168.00	98
NA15014	243.80	99,115
NA15015	334.50	99,115
NA15016	368.60	99,115
NA15017	641.00	99,115
NA15018	907.00	99,115
NA15019	1,361.00	99,115
NA15020	265.70	97
NA15021	355.00	97
NA15022	441.00	97
NA15023	157.50	100
NA15027	84.00	98,100
NA15028	26.30	98,99
NA15029	55.70	101,107,114
NA15030	26.30	115
NA15550	173.70	89
NA15559	140.90	89
NA15560	173.70	89
NA15569	143.00	89
NA15570	59.20	89
NA16002	657.30	45
NA16060	92.00	39
NA16069	81.50	39
NA16160	93.00	39
NA16169	82.50	39
NA16264	24.00	75
NA16265	26.25	75
NA16265L	55.00	31,75
NA16265LC	69.80	75
NA16266	35.00	75
NA16369	820.00	45
NA16469	1,040.00	45
NA17156	1,580.00	45
NA17156HE	1,895.00	45
NA17256	1,202.00	45
NA17256HE	1,533.00	45
NA223529	180.00	72,88
NA254712	43.20	94
NA255002	110.30	85
NA25510	2,772.00	50,61,90
NA255160	2,180.00	89
NA25540	29.50	85
NA25549	27.20	85
NA256011	210.00	61,88
NA256012	315.00	85
NA257102	262.50	100
NA26640	58.40	86
NA26649	96.00	87
NA26650	63.20	86
NA26659	107.70	87
NA26660	122.40	86
NA26669	117.80	87
NA267002	131.30	85
NA267003	24.20	85
NA26710	336.00	88
NA26711	685.00	87
NA26740	116.80	86
NA26749	191.90	87
NA26750	126.40	86
NA26759	215.50	87
NA26760	244.90	86
NA26769	235.60	87
NA29284	64.10	90
NA3140-02	194.30	84
NA35001	93.10	92
NA35002	19.80	92
NA35003	315.00	92
NA35004	593.00	92
NA35005	593.00	92
NA35006	593.00	92
NA35007	78.90	92
NA3520-15	1,575.00	92
NA3540-15	1,785.00	92
NA3540-B	30.00	92
NA3560-15	2,415.00	92
NA39588	90.80	7,105
NA39589	40.00	7,105
NA39753	54.50	7,15,20,105
NA475022	45.20	24
NA503040	44.60	8
NA51059	74.40	8,74,88
NA51069	95.00	8,74,88
NA545305	266.60	19
NA545306	306.90	19
NA545355	318.80	19
NA545356	372.80	19
NA545365	288.60	19
NA545366	346.90	19
NA545395	264.60	19
NA545396	292.30	19
NA546050T	3,496.00	17
NA546050TM	4,195.00	17
NA546060A	4,703.00	17
NA546060AM	5,644.00	17
NA546080A	6,057.00	17
NA546080AM	7,268.00	17
NA546100A	6,640.00	17
NA546100AM	7,968.00	17
NA546120A	9,579.00	17
NA546120AM	11,494.00	17
NA546150A	11,687.00	17
NA546150AM	14,024.00	17
NA546200A	22,684.00	17
NA546250A	33,882.00	17
NA546300A	43,615.00	17
NA546350A	55,150.00	17
NA546510A	4,570.00	20

Code	USD	Page(s)
NA546510AM	5,484.00	21
NA546512A	6,589.00	20
NA546512AM	7,906.00	21
NA546515A	8,452.00	20
NA546515AM	10,142.00	21
NA546550A	3,014.00	20
NA546550AM	3,617.00	21
NA546560A	3,207.00	20
NA546560AM	3,849.00	21
NA546580A	4,176.00	20
NA546580AM	5,011.00	21
NA548052A	4,862.00	5
NA548062A	5,229.00	5
NA548082A	6,326.00	5
NA548102A	6,689.00	5
NA548120A	9,345.00	5
NA548150A	11,340.00	5
NA548200A	17,850.00	5
NA548250A	25,200.00	5
NA548300A	30,500.00	5
NA549350A	50,100.00	5
NA549052A	6,321.00	4
NA549062A	6,799.00	4
NA549082A	8,222.00	4
NA549102A	8,694.00	4
NA549150A	14,732.00	4
NA549200A	24,875.00	4
NA549250A	34,608.00	4
NA549300A	46,350.00	4
NA549350A	55,100.00	4
NA551050A	3,514.00	15
NA551060A	3,757.00	15
NA551080A	4,973.00	15
NA551100A	5,564.00	15
NA551120A	8,097.00	15
NA551150A	10,433.00	15
NA551200A	18,779.00	15
NA551250A	28,169.00	15
NA551300A	36,619.00	15
NA551995	337.30	14
NA551996	372.60	14
NA553252	609.00	64
NA553259	597.40	64
NA553259-B	461.10	64
NA553362	745.00	64
NA553362P	486.70	63
NA553369	730.00	64
NA553369-B	592.00	64
NA553372	862.00	64
NA553372P	486.70	63
NA553379	846.00	64
NA553379-B	710.00	64
NA553662	865.00	64
NA553669	848.00	64
NA553669-B	712.00	64
NA553672	984.00	64
NA553679	965.00	64
NA553679-B	827.00	64
NA570912	3,000.00	61
NA570924	5,700.00	61
NA570971	618.00	61
NA570974	1,235.00	61
NA573022	540.00	61
NA573100	245.00	61
NA573102	125.00	61
NA575002	745.00	61
NA59600	195.50	7,15
NA605010	46.60	30,33,97
NA61241	10.90	31
NA669150	42.80	49
NA669250	42.80	49
NA79701	685.00	101,114
NA79702	1,210.00	101,114
NA79703	1,420.00	101,114
NA79704	1,735.00	101,114
NA79705	2,500.00	101,114
NA863042	52.00	106
NA866027	26.00	106
NA866034	37.00	106
NA866042	57.00	106
NAC41626236	126.50	80
NAC41TT5454	176.50	80
NAC623641TT	165.20	80
NAC6262TT41	142.50	80
NAC6263TT41	154.70	80
NAC62TT6241	142.50	80
NAC62TT6341	154.70	80
NAC72TT6241	170.00	80
NAC72TT7241	197.50	80
NAL5263	69.80	80
NAL5736	53.00	80
NAL6262	39.50	80
NAL6263	51.70	80
NAL6273	84.30	80
NAL6363	63.80	80
NAL7262	67.00	80
NAL7263	79.20	80
NAL7273	111.80	80
NAS10001	280.40	82
NAS10002	140.70	82
NAS10004	168.00	82
NAS10005	252.00	82
NAS10030	78.80	82
NAS10032	29.40	82
NAS14406	2,618.00	82
NAS14408	3,092.00	82
NAS14410	3,444.00	82
NAS20025	2,657.00	84,107
NAS20050	3,176.00	84,107
NAS20053	4,043.00	84
NAS20080	3,754.00	84,107
NAS20082	6,064.00	84
NAS20083	5,486.00	84
NAS20120	4,967.00	84,107
NAS20122	7,161.00	84
NAS20123	6,526.00	84
NAS20124	7,392.00	84
NAS30020	12,273.00	83
NAS30020-P	8,596.00	83
NAS300201	15,051.00	83
NAS300201P10	16,857.00	83
NAS300201P8	15,983.00	83
NAS30020P10	13,127.00	83
NAS30020P8	12,690.00	83
NAS30040	16,384.00	83
NAS30040-P	9,907.00	83
NAS300401	19,306.00	83
NAS300401P10	22,020.00	83
NAS300401P8	20,710.00	83
NAS30040P10	18,220.00	83
NAS30040P8	17,346.00	83
NAS30042	16,859.00	83
NAS30042-P	10,453.00	83
NAS300421	19,852.00	83
NAS300421P10	22,566.00	83
NAS300421P8	21,256.00	83
NAS30042P10	18,766.00	83
NAS30042P8	17,892.00	83
NAS30060	20,087.00	83
NAS30060-P	10,780.00	83
NAS300601	23,071.00	83
NAS300601P10	27,014.00	83
NAS300601P8	25,043.00	83
NAS30060P10	22,894.00	83
NAS30060P8	21,583.00	83
NAS30062	20,562.00	83
NAS30062-P	11,326.00	83
NAS300621	23,617.00	83
NAS300621P10	27,560.00	83
NAS300621P8	25,589.00	83
NAS30062P10	23,440.00	83
NAS30062P8	22,129.00	83
NAT417264	106.60	80
NAT417272	111.20	80
NAT523641	90.50	80
NAT524136	90.50	80
NAT545641	77.00	80
NAT574136	61.30	80
NAT623641	70.50	80
NAT624136	70.50	80
NAT624162	47.80	80
NAT626241	47.80	80
NAT626262	48.90	80
NAT626341	60.00	80
NAT626362	61.10	80
NAT6263TT	99.80	80
NAT62TT63	99.80	80
NAT634162	60.00	80
NAT636262	61.10	80
NAT6362TT	99.80	80
NAT724162	75.30	80
NAT724164	106.60	80
NAT724172	111.20	80
NAT72TT72	159.00	80
R11059	5.70	79
R11217	7.90	75
R21180	6.30	85
R29326	9.35	91
R31495	9.10	95
R31589	19.50	76,77
R31706	34.10	79,95
R31981	13.90	75
R39204	4.20	53
R41298/C	4.60	93
R41441	49.20	77
R41447	35.50	7
R41660	65.20	76
R50005	4.30	77
R50008	9.00	77
R50047	17.90	77
R50048	21.80	77
R50056	3.30	95
R50057	4.40	76
R50058	1.80	77,93
R50060	21.10	76
R50065	4.30	77
R51838	47.30	76
R53003	38.60	77
R53004	38.60	77
R53005	44.10	77
R56142	2.50	22
R56214	2.60	22,49
R59119	16.00	22
R59681	24.00	22
R67032	2.80	95
R69413	9.50	49
Z111000	145.60	32
Z113000	174.30	32
Z114000	174.30	32
Z115000	174.30	32
Z116000	145.60	32
Z121000	134.90	32
Z123000	163.70	32
Z124000	163.70	32
Z125000	163.70	32
Z126000	134.90	32
Z131000	159.20	32
Z133000	187.80	32
Z134000	187.80	32
Z135000	187.80	32
Z136000	159.20	32
Z141000	148.50	32
Z143000	177.10	32
Z144000	177.10	32
Z145000	177.10	32
Z146000	148.50	32
Z151000	151.10	32
Z161000	139.00	32

Code	USD	Page(s)
Z200041	63.70	33
Z200042	63.70	33
Z200043	63.70	33
Z200053	82.00	33
Z200411	63.70	33
Z200412	63.70	33
Z200413	63.70	33
Z200431	58.40	33
Z200432	58.40	33
Z200512	87.40	33
Z200513	87.40	33
Z200515	87.40	33
Z200517	87.40	33
Z200532	76.90	33
Z200533	76.90	33
Z200535	76.90	33
Z200537	76.90	33
Z200617	137.90	33
Z200635	130.00	33
Z200637	130.00	33
Z200687	87.40	33
Z200737	174.90	33
Z207433	82.00	33
Z207533	100.50	33
Z207537	100.50	33
Z300041	84.90	33
Z300042	84.90	33
Z300043	84.90	33
Z300053	102.00	33
Z300411	84.90	33
Z300412	84.90	33
Z300413	84.90	33
Z300431	79.60	33
Z300432	79.60	33
Z300512	106.10	33
Z300513	106.10	33
Z300515	106.10	33
Z300517	106.10	33
Z300532	98.40	33
Z300533	98.40	33
Z300535	98.40	33
Z300617	159.20	33
Z300635	148.40	33
Z300637	148.40	33
Z300687	111.00	33
Z300737	180.20	33
Z307433	103.30	33
Z307537	121.90	33
Z40	220.30	31
Z40F	236.30	31
Z42	227.60	31
Z44	204.00	31
Z44P	281.00	31
Z45	222.50	31
Z45P	285.50	31
Z45PL	314.20	31
Z46	275.60	31
Z46P	323.00	31
Z47	320.50	31
Z50	225.80	31
Z50F	241.80	31
Z54	209.50	31
Z54P	286.50	31
Z55	228.00	31
Z55P	291.00	31
Z55PL	319.80	31
Z56	281.10	31
Z56P	328.50	31
Z57	326.00	34
ZSR101	160.00	34
ZSR103	375.00	34
ZSR104	440.00	34
ZSR106	540.00	35
ZVR103	285.00	35
ZVR104	340.00	35
ZVR106	440.00	35

LIMITED WARRANTY

Limited Warranty:

Caleffi North America (Caleffi) warrants that all its products sold in accordance with these warranty provisions shall be free from defects in material and workmanship, or other malfunction or failure to perform, under normal use and services. This warranty extends only to persons or organizations that purchase Caleffi products for resale. This warranty is valid for the time listed below from the date of manufacture by product classification listed below:

Standard Components:	2 years
Switching Zone Relays:	3 years
Switching Relay & Valve:	5 years (Z-one™ ZVR series relay and Z-one™ zone valve installed together)
Storage Tank and SolarFlex™:	6 years
Solar Collectors:	10 years

Caleffi's sole obligation hereunder shall be, at its option, to issue credit, repair or replace any component which is proved to be defective. This limited warranty does not cover the cost of transportation or labor charges, including installation and removal, unless such charges are authorized in writing in advance by Caleffi. The solar heat transfer fluid, and maintenance schedule, must be per Caleffi specification. Specifically excluded from this warranty are glass breakage and the effects of frost or acts of God (force majeure) responsible for system or component malfunction.

Caleffi is not responsible for malfunction resulting from any unauthorized alterations made to any Caleffi system components. Caleffi assumes no responsibility for damage to any system component caused by neglect, abuse, faulty installation, misuse, handling or cause not in Caleffi control or not an inherent defect. Caleffi is not liable for consequential damage or expenses, the total liability shall be limited to replacement and repair as stated above.

Disclaimer of Warranties:

CALEFFI NORTH AMERICA (CALEFFI) DISCLAIMS ANY WARRANTY NOT PROVIDED HEREIN INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. IT IS EXPRESSLY UNDERSTOOD THAT CALEFFI IS NOT RESPONSIBLE FOR ANY CONSEQUENTIAL OR OTHER DAMAGES THAT MAY ARISE FROM USING CALEFFI SYSTEM COMPONENTS. DAMAGE RESULTING FROM WATER FREEZING IN THE TUBING DOES NOT CONSTITUTE A DEFECT IN MATERIAL OR WORKMANSHIP, AND SHALL NOT BE COVERED BY THIS WARRANTY.

CALEFFI DISCLAIMS ANY STATUTORY OR IMPLIED WARRANTY OF HABITABILITY. CALEFFI FURTHER DISCLAIMS ANY RESPONSIBILITY FOR LOSSES, EXPENSES, INCONVENIENCES, SPECIAL, INDIRECT, SECONDARY, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING FROM OWNERSHIP OR USE OF THE ARTICLES SOLD HEREUNDER. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE FACE HEREOF.

Low Lead Notice:

Products identified as "Low Lead" comply with the "Reduction of Lead in Drinking Water Act" a amendment to the "Safe Drinking Water Act" (SDWA) Section 1417. These products can be used in potable water services such as drinking water, hand washing, food service and dish washing.

Products not specifically identified as "Low Lead" are intended for hydronic heating and cooling applications and do not comply with SDWA Section 1417; they cannot be installed in new potable water services.

Form No. 20301/16
Suggested List Price
Effective March 1, 2016
Canceling All Prior Issues
specifications and prices are subject to change without notice

Caleffi North America, Inc. / 3883 W. Milwaukee Road / Milwaukee, WI 53208
Tel: 414.238.2360 / Fax: 414.238.2366
www.caleffi.com / orders.us@caleffi.com