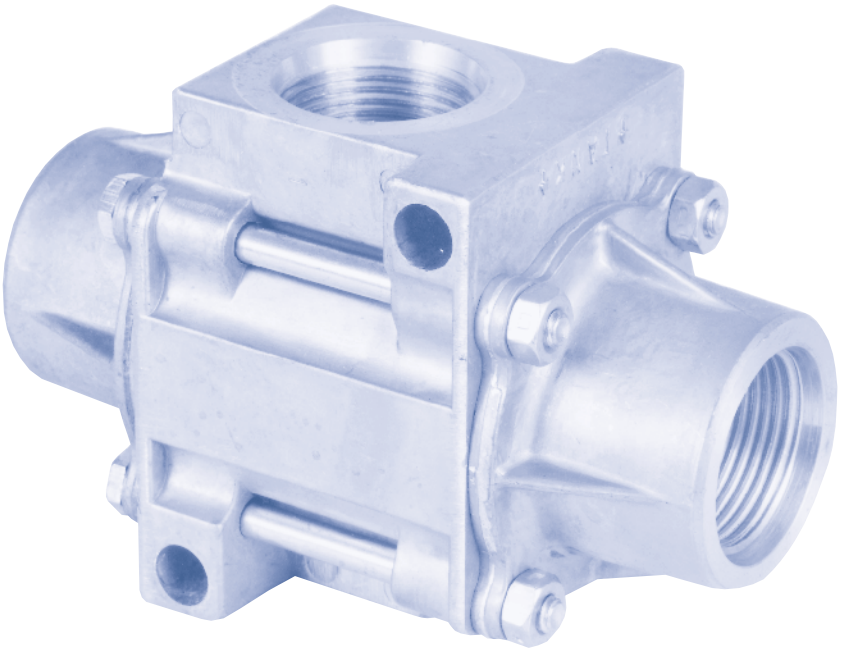
Accessories

Thermal Transfer Products provides an array of highly engineered accessories that function with our integrated cooling modules, as well as copper, aluminum and steel heat exchangers.



4

Modulating Water Valves and Bulb Wells

Water Strainers

Three-Way Thermostatic Valves

Thermal Bypass Assembly

Electronic Temperature Control & Bulb Well Assembly (AC)

Thermostatic Temperature Controller (DC)

Temperature Sensors

Electronic Temperature Sensors

PB2P Fan Controller

Brushless DC Pulse Width Modulation (PWM) Sensor

Brushless DC Wiring Harness

Compressed Air Separators

Automatic Float Drain

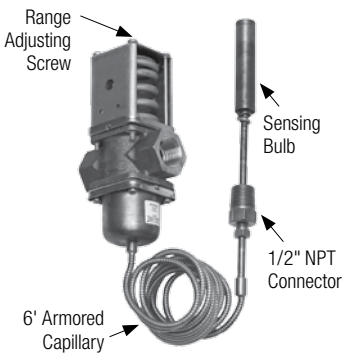
Flexible Metal Hose

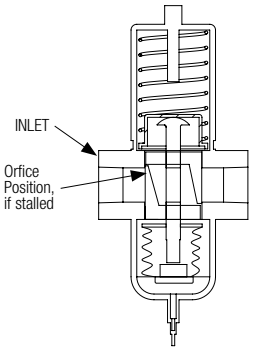
Thermal Transfer Products
An **API Heat Transfer** Company

A global leader in the design and manufacture of highly engineered heat transfer products.

Modulating Water Valves and Bulb Wells

APPLICATION: These modulating valves regulate the flow of water to the heat exchanger to maintain a desired exiting oil temperature. They open automatically when temperature increases at the sensing bulb. **No** externa power source is required to actuate the valve. **Not to be** used for salt water service.



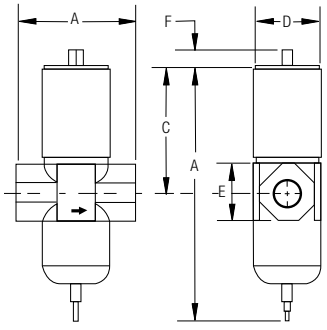


WATER VALVES					BULB WELLS
PART NUMBER	PIPE SIZE (NPT)	RANGE (OPENING POINT)	SENSING BULB SIZE DIAMETER x LENGTH	MAXIMUM WATER FLOW	RECOMMENDED SIZE
65293	1/2"	115°F to 180°F	11/16" x 3-1/4"	25 GPM	L-65140
65127	3/4"			40 GPM	
65128	1"		11/16" x 6"	55 GPM	L-65141
65146	1-1/4"			75 GPM	
65511	1/2"	75°F to 135°F	11/16" x 10"	25 GPM	L-65280
65253	3/4"			40 GPM	
65254	1"		11/16" x 16-1/4"	55 GPM	L-67438
65255	1-1/4"			75 GPM	
66100	1-1/2" ASME			90 GPM	
67173	2" ASME	75°F to 115°F	11/16" x 43"	150 GPM	L-67808

*Working pressure to 150 PSI Maximum. *For additional protection of the bulb well stem, use the next longer bulb well.*

ADJUSTMENT: 1/2" to 1-1/4" valves can be adjusted with a screwdriver, 1-1/2" and 2" have a 1/2" square shaft. Turn the adjusting screw clockwise to **decrease** opening temperature; and counterclockwise to **increase** opening temperature. Valves are not calibrated, so final desired temperature setting must be established experimentally. Valve is fully open 36°F above opening point.

Water Valves



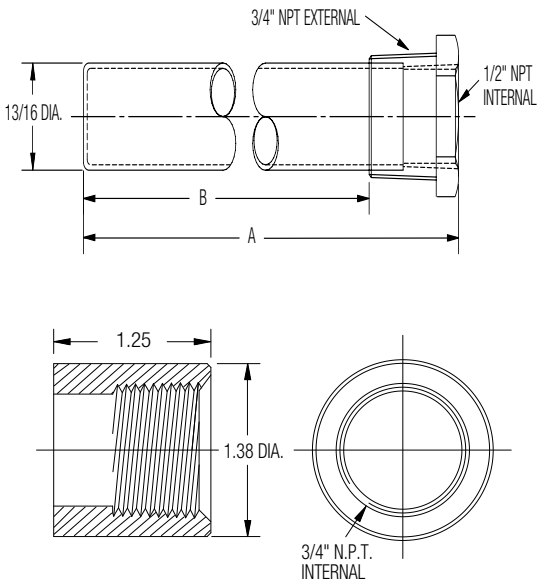
Standard temperature elements are furnished with 6' capillary. Longer capillary lengths not available. Valve Disc: Buna N in brass disc retainer.

VALVE SIZE	DIMENSIONS IN INCHES						APPROXIMATE SHIP WEIGHT
	A	B	C	D	E	F	
1/2"	3-1/4	7	3-3/8	1-27/32	1-1/2	13/32	4.3 lbs.
3/4"	3-9/16	7-29/64	3-51/64	2-1/32	1-3/4		5.8 lbs.
1"	4-27/32	10-13/16	5-31/64	2-5/8	2	1/2	10 lbs.
1-1/4"	4-55/64	10-37/64	5-43/64		2-3/8		12 lbs.
1-1/2"	5-5/16				See Flange Below		18 lbs.
2"	6-5/8	12-33/64	6-15/32	3-1/2			27 lbs.

VALVE SIZE	FLANGE SPECIFICATIONS–INCHES			
	# OF BOLT HOLES	BOLT HOLE SIZE	BOLT CIRCLE	FLANGE DIAMETER
1/2"	4	5/8	3-7/8	5
2		3/4	4-3/4	6

Modulating Water Valves and Bulb Wells

Bulb Wells



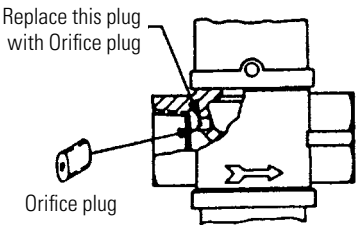
65187 Half Coupling - Mount to Reservoir. For use with all bulb wells shown above.

BULB WELL PART NUMBER	DIMENSIONS IN INCHES A	DIMENSIONS IN INCHES B	APPROXIMATE SHIPPING WEIGHT	MATERIALS
65140	4-15/32"	3-15/32"	1 lb.	Tube - Copper Fitting- Brass
65141	7-7/32"	6-7/32"		
65280	11-7/32"	10-7/32"		
67438	17-15/32"	16-15/32"		
67808	44-3/8"	43-3/8"		

Custom Bulb Well lengths available. Consult factory for additional information.

WATER VALVE PART NUMBER	BY-PASS ORIFICE DIAMETER	MAXIMUM BULB TEMPERATURE °F	OPENING TEMPERATURE (FACTORY SETTING) °F
65293	.062"	200	135
65127			
65128	.093"		
65146			
65511	.062"	155	103

WATER VALVE PART NUMBER	BY-PASS ORIFICE DIAMETER	MAXIMUM BULB TEMPERATURE °F	OPENING TEMPERATURE (FACTORY SETTING) °F
65253	.062"	200	135
65254			
65255	.093"		
66100			
67173	.125"	155	103

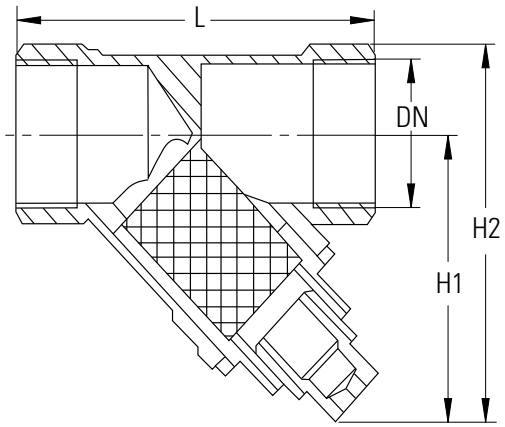


All stock valves are supplied with a drilled and tapped internal by-pass in the regulator body. A solid plug is installed in this hole for 100% shut-off. A drilled orifice plug is packed in an envelope with each valve for field installation, if continuous minimum flow is required.

Forged Brass Y-Strainer

Features

- Suitable for 600 WOG Service, 150PSI WSP, With Easy Clean Plug
- MSS SP-110 Approved
- Temperature Range: -10°F to 250°F
- Heavy Duty Forged Brass Construction
- Screwed Caps are Straight Threaded with PTFE Gaskets
- 304 Stainless Steel 50 Mesh Screen 1/4" - 1"
- 304 Stainless Steel 20 Mesh Screen 1-1/4" - 2"
- Threaded Ends Comply with ANSI.B2.1
- Female x Female Connection



Part Number	DN (NPT)	L	H1	H2	Weight Lbs.
56944	1/4	1.97	1.50	1.90	0.22
65294	3/8	1.97	1.50	1.90	0.21
65295	1/2	2.36	1.97	2.44	0.38
65296	3/4	2.76	2.09	2.68	0.57
65297	1	2.95	2.24	2.95	0.9
65301	1-1/4	3.54	2.76	3.74	1.3
65302	1-1/2	4.09	2.99	4.17	1.81
65303	2	4.72	3.35	4.96	3.31

All dimensions in inches, unless noted otherwise.

Three-Way Thermostatic Valves

1/2", 3/4", 1", 1-1/2" & 2" NPT Ports*

Features

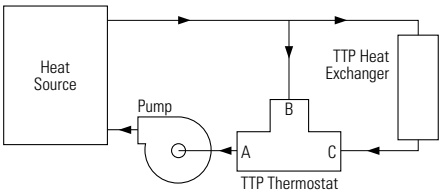
- **Self-Contained**
- **Wide Range of Temperatures**
- **Rugged Construction**
- **Non-Adjustable**
- **Heavy Duty**
- **Operate in Any Position**
- **Tamper-Proof**
- **Replaceable Element**
- **Compact**

Materials

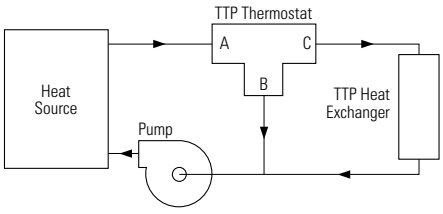
Housing Grey Iron (steel or bronze optional)
125 PSI maximum operating pressure

O-Ring Seals Viton (Buna N optional)

**3", 4" and 6" Flange Models also available.*



Mixing Application



Diverting Application

Operation

TTP thermostatic valves use the principle of expanding wax. A self-contained power element activates a stainless steel sliding valve that provides a positive three-way valve action. All temperature settings are factory set. Elements are field replaceable to obtain the same, or a new bypass temperature setting.

On starting, total flow is in the bypass mode. As the fluid temperature rises, some fluid is diverted to the cooling system. As fluid temperature continues to rise, more flow is diverted until the valve is fully stroked. At this point, all the flow is diverted to the cooler. With respect to temperature ranges, the "nominal" temperature represents the "operating temperature." The first figure in the temperature range represents the valve opening point, and the second figure represents the full open point.

Valves are acceptable for oil or water service.

Applications

Three Way Thermostatic Valves may be installed for either mixing or diverting modes of operation at the preference of the user. They may be mounted in any plane.

When installed as a mixing valve, it is on the cold side of the application, and mixes hot liquid with cooled liquid to discharge the proper temperature fluid to the process.

When installed as a diverting valve, it is on the hot side of the application, and bypasses the cold liquid allowing the system to warm up, then directs the hot liquid to the cooler.

Temperature settings are nominal. 110°F and 140°F are standard. Other settings are available upon request. The valves begin to "shift" (open) about 10°F below the nominal temperature setting and are fully shifted about 10°F above.

Typical Installation

Hydraulic Power Units Diverting mode 110°F

Air Compressors Mixing mode 140°F

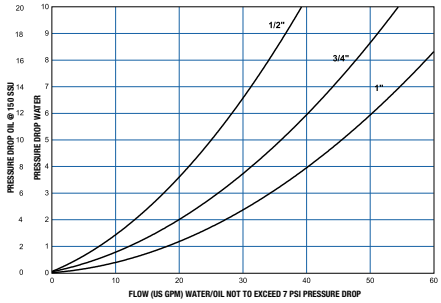
Mobile Oil Coolers Diverting mode 110°F

Radiators Diverting mode 190°F

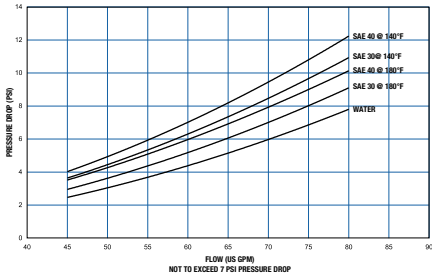
Three-Way Thermostatic Valves

Pressure Drop Curves

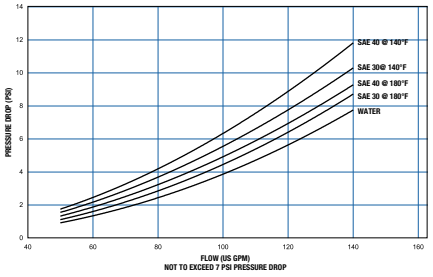
1/2" - 3/4" - 1"



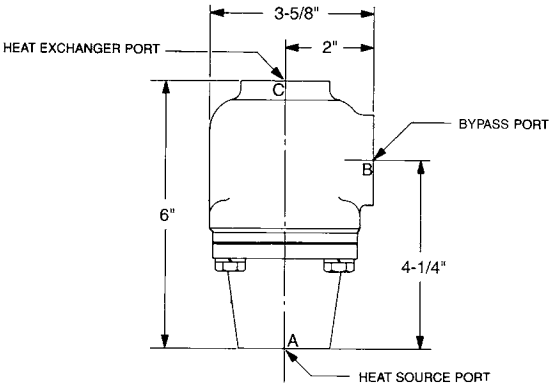
1-1/2"



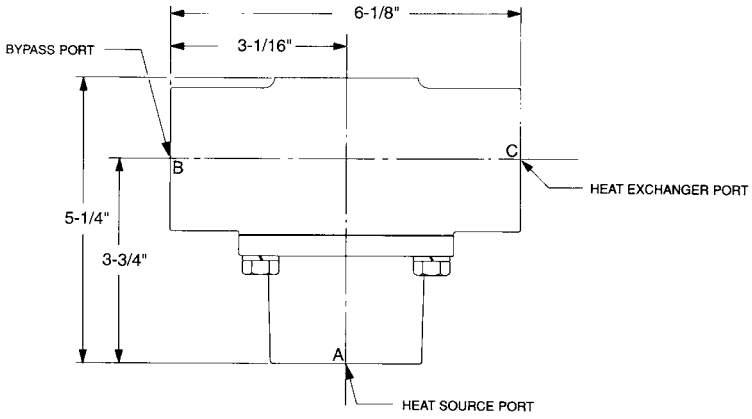
2"



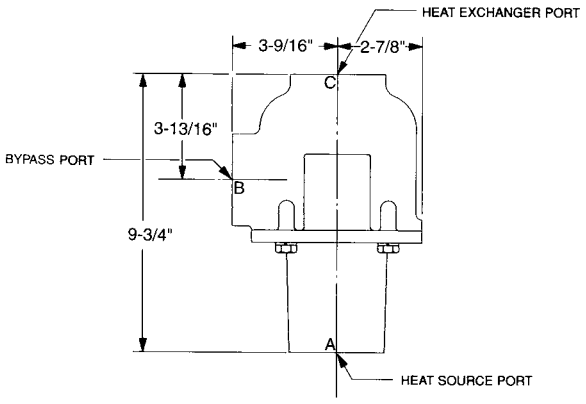
Dimensions and Part Numbers



PORT SIZE	PART NUMBER
1/2" NPT	66037-110°F
1/2" NPT	66037-140°F
3/4" NPT	66038-110°F
3/4" NPT	66038-140°F
1" NPT	66039-110°F
1" NPT	66039-140°F
#16 SAE	67365-110°F
#16 SAE	67365-140°F



PORT SIZE	PART NUMBER
1-1/2" NPT	66040-110°F
1-1/2" NPT	66040-140°F
#24 SAE	67760-110°F



PORT SIZE	PART NUMBER
2" NPT	66041-105°F
2" NPT	66041-140°F

NOTE: All three ports on any one valve have the same thread size.

Three-Way Thermostatic Valves

Special Temperature Ranges

1/2" – 3/4" – 1" NPT PART NUMBERS	1 1/2" NPT PART NUMBERS	2" NPT PART NUMBERS
65974	65977	65978
65975	66040	66041
65976	67760	
66037	(#24 SAE)	
66038		
66039		
67365		
(#16 SAE)		

1/2" – 3/4" – 1" NPT		1 1/2" NPT		2" NPT	
NOMINAL	TEMPERATURE RANGE (°F)	NOMINAL	TEMPERATURE RANGE (°F)	NOMINAL	TEMPERATURE RANGE (°F)
80	77-88	80	70-88	75	70-85
90	80-100	90	80-100	90	85-105
110	100-120	110	100-120	105	100-116
120	110-130	120	110-130	120	110-130
130	120-140	130	120-140	130	124-140
140	130-150	140	130-150	140	135-150
150	140-160	150	140-160	150	145-160
160	150-170	160	150-170	155	150-165
170	163-180	170	163-180	160	155-172
185	175-190	175	170-185	165	160-175
195	185-200	180	175-190	170	165-180
200	190-210	190	185-200	180	175-190
		200	190-210	195	188-208
				210	200-215

EXAMPLE: 1" NPT, Part Number 66039-90 indicates the 1" NPT valve with a nominal shift temperature of 90°F. The actual operating temperature range in this example is 80-100°F. The valve begins to open at 80°F, and is fully open at 100°F.

How to Order *Consult factory for pricing and lead time*

					–				°F
Valve Part Number						**Nominal Temperature Setting**			

ACCESSORIES

Thermal Bypass Assembly

This thermal bypass valve is ideally suited for hydrostatic drive circuits which require fast warm-up, controlled fluid temperature, and low return line back pressure. When installed in the return line of a hydraulic circuit that employs an oil cooler, this device will modulate fluid temperature by either shifting return line flow through the cooler, or bypassing directly to the reservoir. In addition, a built-in pressure relief function automatically relieves excess pressure to the reservoir should the cooler become restricted and resultant pressure drop become too high for the cooler circuit.

Features

Standard Shift Temperatures
100°F (38°C) 120°F (49°C) 140°F (60°C) 160°F (71°C)

Full Shift (Cooler Port Open) Temperatures
Shift temperature plus 25°F (14°C)

Relief Valve Setting 65 psi (4.5 bar) *Consult factory for other pressure settings.*

Maximum Operating Pressure 250 psi (17 bar)

Proof Pressure 300 psi (21 bar)

Minimum Burst Pressure
Up to the full shift temperature: 325 psi (22 bar).
Above the full shift temperature: 600 psi (41 bar).

Minimum Operating Temperature -30°F (-34°C)

Maximum Operating Temperature Shift temperature plus 75°F (24°C)

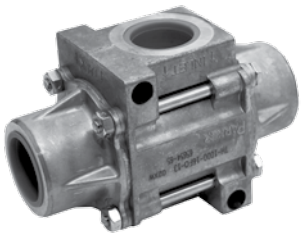
Maximum Flow Rating 60 gpm (227 l/m)

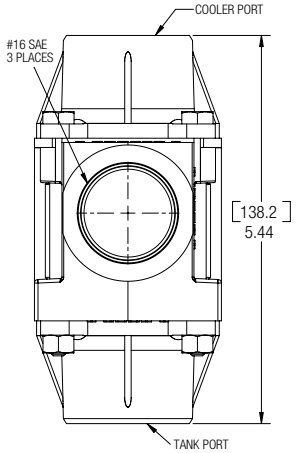
Leakage @ 250 psi (17 bar) and 60 gpm (227 l/m) Inlet Flow
Cooler Port:
- 0.5 gpm (2 l/m) maximum up to 5°F (3°C) before shift temp.
- 1.0 gpm (4 l/m) maximum from 5°F (3°C) before shift to shift.

Tank Port: 0.10 gpm (0.4 l/m) maximum

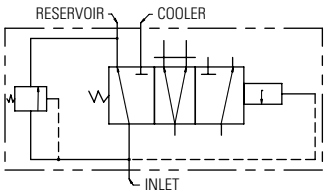
Operating Fluid Mineral base hydraulic fluids

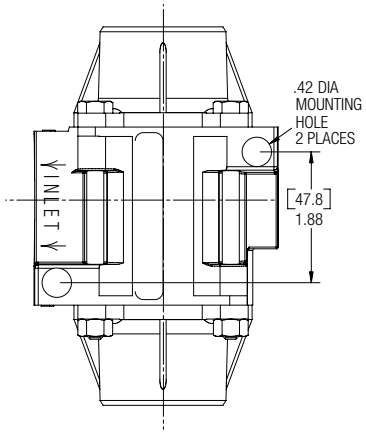
Construction Aluminum die-cast housing

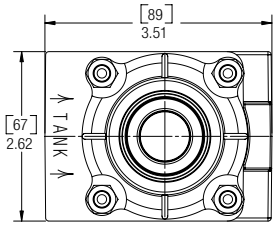




Graphic Symbol



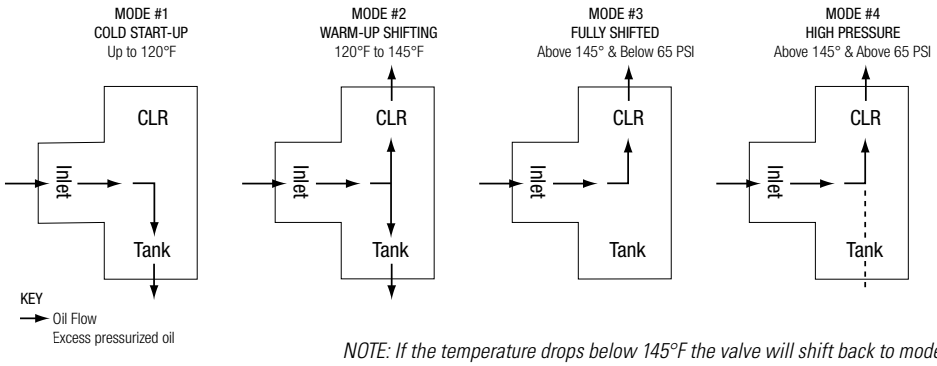




Operating Characteristics

- Mode 1: At temperatures below the shift temperature oil flows from inlet to tank port.
- Mode 2: At temperatures between the start of shift and full shift the flow from the inlet port is divided between the cooler and tank ports.
- Mode 3: At temperatures above the full shift temperature inlet flow is through the cooler port.
- Mode 4: At temperatures above the full shift temperature the excess pressure is relieved through the tank port.

For 120° F Shift Temperature



NOTE: If the temperature drops below 145°F the valve will shift back to modes 2 or 1.

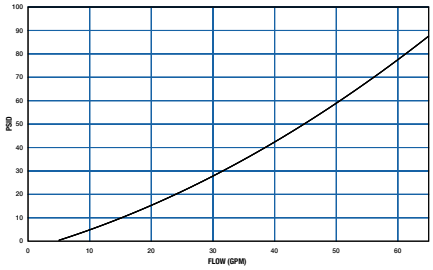
ACCESSORIES

ttpsales@apiheattransfer.com 262.554.8330 www.thermaltransfer.com

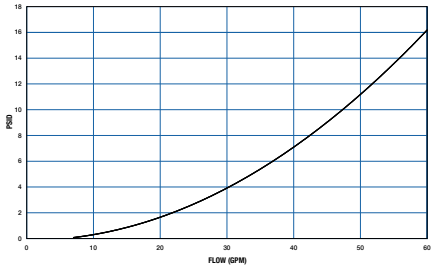
Thermal Bypass Assembly

Pressure Drop (Mobile DTE 26 OIL)

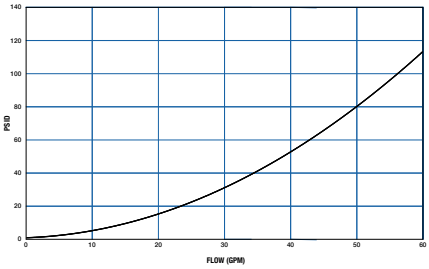
Inlet Port Thru Tank Port @ 100°F (38°C) (300 SUS)



Inlet Port Thru Cooler Port @ 145°F (63°C) (110 SUS)



Inlet Port Over Integral Relief Valve @ 170°F (77°C) (78 SUS)



NOTE: Pressure drop shown is added to relief valve crack pressure for total pressure drop.

PART NUMBER	SHIFT TEMPERATURE
65654	100°F (38°C)
65655	120°F (49°C)
65656	140°F (60°C)
65657	160°F (71°C)

How to Order

Consult factory for pricing and lead time

[ ][ ][ ][ ][ ] – [ ][ ] – **Thermal Bypass Assembly**

Part Number

Pressure Setting
65 = Standard, 65 PSI
Optional pressure settings available in 5 PSI increments, up to 85 PSI.

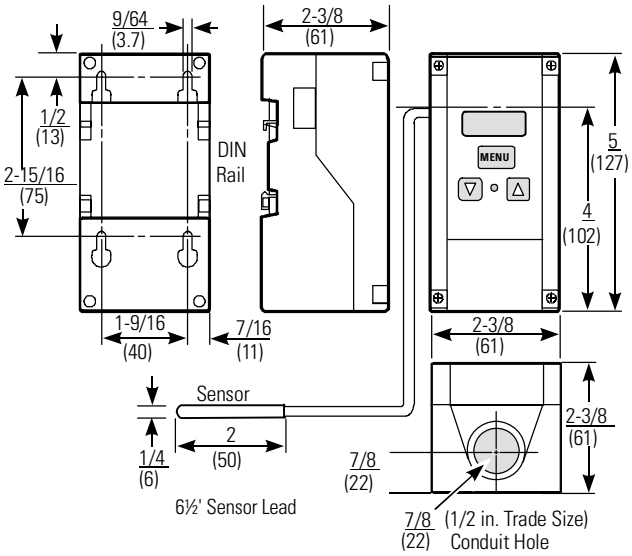
Electronic Temperature Control & Bulb Well Assembly (AC)

Part Number 86816

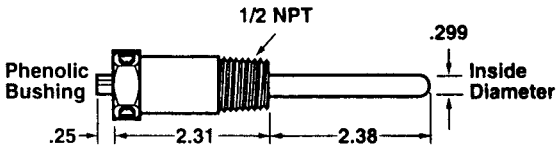
This is a line voltage single-stage electronic temperature control with single-pole, double-throw relay output and LED indication. It is designed with heating or cooling modes of operation, adjustable differential, and an interchangeable temperature sensor. The control couples electronic accuracy with remote sensing capability in a NEMA 1 high-impact plastic enclosure suitable for surface or DIN-rail mounting.

Pilot Duty Relay needed for 460V not offered by Thermal Transfer Products.

67428 Temperature Control with NEMA 1 Enclosure Dimensions - Inches (mm)



67429 Bulb Well Dimensions - Inches



Specifications

Product	Electronic Temperature Control			
Setpoint Range	-30°F to 212°F (-34°C to 100°C)			
Differential Range	1°F to 30°F (0.5°C to 17°C)			
Input Voltage	120 or 208/240 VAC, 50/60 Hz			
Current Draw	1.8 VA			
Relay Electrical Ratings	SPDT	120V NO (NC)	280V NO (NC)	240V NO (NC)
	Horsepower:	1 (0.25) hp	1 (0.33) hp	1 (0.5) hp
	Full Load Amps:	16 (5.8) A	9.2 (4.0) A	8.0 (4.9) A
	Locked Rotor Amps:	96 (3) A	55 (24) A	48 (29) A
	Non-Inductive Amps:	15 (10) A	10 (10) A	10 (10) A
	Pilot Duty: 125 VA (NO) @ 24-240 VAC, 125 VA (NC) @ 120-240 VAC, 50 VA (NC) @ 24 VAC			
Sensor Type	Replaceable Thermistor with Reference Resistance of 2.25 K ohms at 77°F (25°C)			
Control Ambient Temperature	Operating: –30°F to 140°F (–34°C to 60°C) Shipping: –40°F to 185°F (–40°C to 85°C)			
Ambient Humidity	0 to 95% RH Non-Condensing, Maximum Dew Point: 85°F (29°C)			
Control Material	Case and Cover: NEMA 1 High Impact Lexan 950® Plastic.			
Agency Listings	UL Listed: File E27734, Guide XAPX (Temperature Indicating and Regulating Equipment) CSA Approved File LR948 Class 4813-02			

Lexan 950 is a registered trademark of the General Electric Company. The performance specifications are nominal.

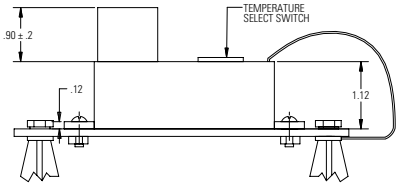
Thermostatic Temperature Controller (DC)

Features

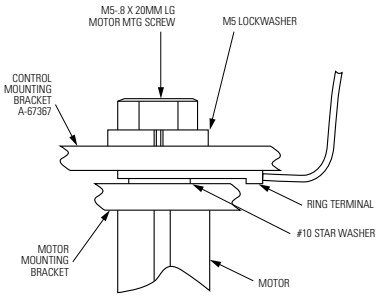
- **12 or 24 volt operation**
- **Temperature sensor provided**
- **Mounting hardware included**
- **For use with 1 or 2 fan models**
  (Relay needed for 2 fan models – not offered by Thermal Transfer Products)
- **Wiring provided for remote manual override**
- **Adjustable temperature settings range from 100°F thru 210°F in 20°F increments**

This controller was designed to mount on the cooler without requiring extensive wiring or plumbing. It provides accurate temperature control by cycling the cooling fan(s) to maintain desired oil temperature.

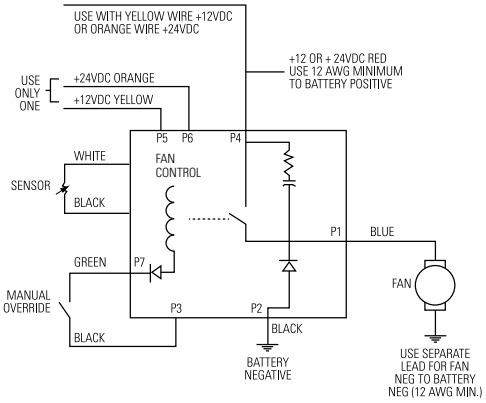
Connection Assembly



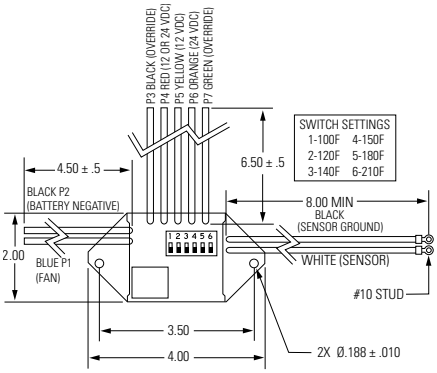
Control Dimensions

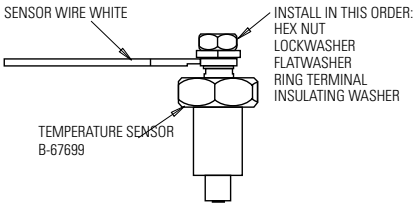


Electrical Schematic



Wiring Diagrams



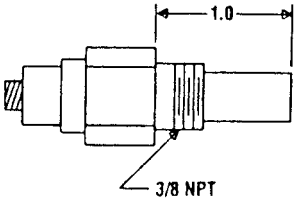


NOTE: This switch should be fused to prevent damage if ground is lost.

A 30 Amp Fuse is required in the power supply.

If manual override switch is not used, insulate P3 Black and P7 Green individually.

Sensor Dimensions



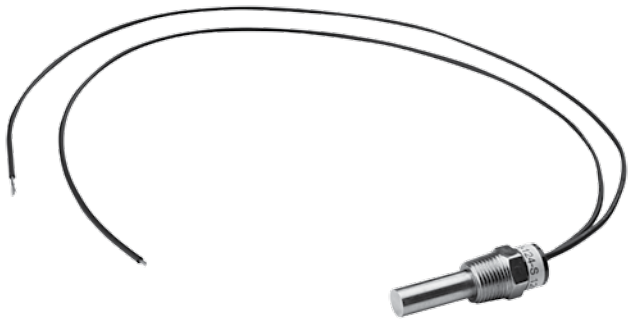
How to Order

Part Number

96171	Electronic Fan Control Kit
68790	Replacement Control Only

Temperature Sensors

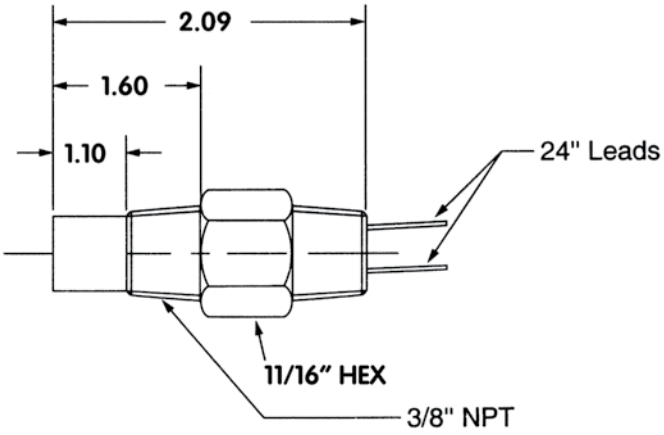
Normally Open (Closed on temperature rise)



Contact Rating	6 AMPS AT 120 VAC 4 AMPS AT 240 VAC
Voltage	0.1 to 240 volts AC or 12 VDC 8 AMPS, 24 VDC 4 AMPS
Pressure	1,000 PSI operating
Material	303 Stainless Steel Housing

PART NUMBER	SET TEMPERATURE (°F)
65769	140
65769	120

**Switching temperature ranges from one (1) to six (6) °F. Other temperature settings are available. Consult factory for options. For DC applications, do NOT wire directly to motor. (Relay needed.)*



How to Order

Consult factory for pricing and lead time

					–				–	Temperature Sensor

Part Number

Set Temperature

140
120

All shipments FOB Racine, WI USA

Electronic Temperature Sensors

Electronic temperature sensor

- Process connection: 1/4" NPT
- 2 switching outputs complementary hysteresis adjustable
- Measuring range of -13 - 284 °F (-25 - 140 °C)

Function

The unit generates 2 output signals: 1 x NO + 1 x NC with separately adjustable switch points (SET 1) and (SET 2).

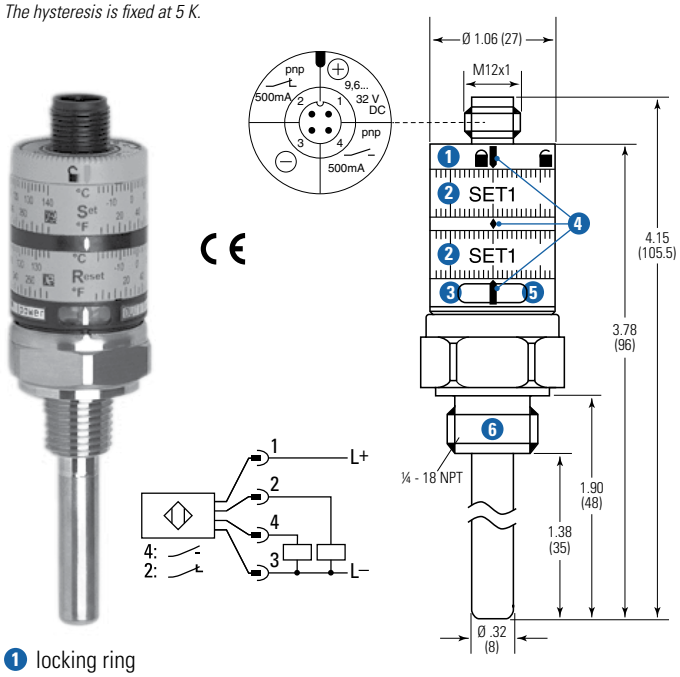
OUT1

- With rising temperature OUT1 closes when the set value (SET1) is reached.
- With falling temperature OUT1 opens when the value (SET1) minus hysteresis is reached.

OUT2

- With rising temperature OUT2 opens when the set value (SET2) is reached.
- With falling temperature OUT2 closes when the value (SET2) minus hysteresis is reached.

The hysteresis is fixed at 5 K.



1. locking ring
2. setting rings (manually adjustable after unlocking)
3. LED yellow: lights if OUT1 = ON, temperature > [SET1]
4. setting marks
5. LED yellow: lights if OUT2 = ON, temperature < [SET2]
6. process connection 1/4" NPT

Pin 4 = OUT1 / Pin2 = OUT2

To obtain the setting accuracy, set both rings to minimum values, and then set desired values.
All dimensions in inches (millimeters), unless noted otherwise.

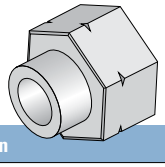
Technical Data	
Application	**Liquid and Gases**
Electrical Design	**DC PNP**
Output	**Normally open/closed complementary**
Operating voltage (V)	9.6 - 32[1]
Current rating (mA)	500
Short-circuit protection	Yes (non-latching)
Reverse polarity protection	Yes
Overload protection	Yes
Voltage drop	< 2
Current consumption	< 30
Setting Range	
Set point, SP	3 - 284 / 37 - 543 °F (-16 - 140 / 3 - 284 °C)
Reset point, rP	-4 - 277 /25 - 531 °F (-20 - 136 / -4 - 277 °C)
Adjustment of the switch point	Shims
Accuracy	
Setting accuracy	± 3 K
Repeatability	± 0.1 K
Temperature drift	0.1 / 10 K
Power-on delay time	0.5 s
Measuring element	1 x Pt 1000, to DIN EN 60751, class B
Dynamic response T05 / T09	1/3 s*
Minimum installation depth	.59 inches (15 mm)
Medium temperature	-13 - 257 °F (-25 - 125 °C) 293 °F (145 °C) max. 1 h
Ambient temperature	-13 - 158 °F (-25 - 70 °C)
Storage temperature	-40 - 257 °F (-40 - 212 °C)
Protection	IP 67, III
Shock resistance	DIN IEC 68-2-27:50 g (11 ms)
Vibration resistance	DIN EN 60068-2-6:20 g (10 - 2000 Hz)
EMC	EN 61000-4-2 ESD: 4 kV CD / 8 kV AD EN 61000-4-3 HF radiated: 10 V/m EN 61000-4-4 Burst: 2 Kv EN 61000-4-6 HF conducted: 10V
Housing materials	Stainless steel 316L / 1.4404; PC (Makrolon); PBT (Pocan); FPM (Viton)
Materials (wetted parts)	Stainless steel 316L / 1.4404
Display	Power: LED green; Switching status: LED yellow
Connection	M12 connector; gold-plated contacts
Weight	0.229 lbs (0.104 kg)

1 Operating voltage "supply class 2" to cULus.
** According to DIN EN 60751*
The values for accuracy apply to flowing water.

Thermal Transfer Part Number	Description
55857	Temperature Sensor, dual PNP outputs, 1/4" NPT
55858	Cover, Protective, PK
55859	4-wire Micro DC cordset, straight connector
51661**	Bulb Well

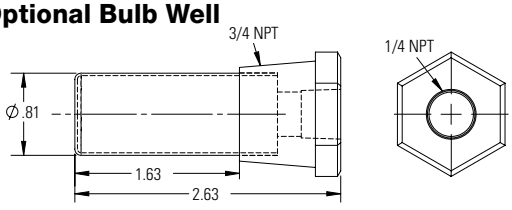
***Optional*

Sensor Port Adapters



Part Number	Description
51627	#8SAE TO 1/2" BSPP
51653	#8 SAE TO 1/4" NPT
51654	#8 SAE TO 1/2" NPT

Optional Bulb Well



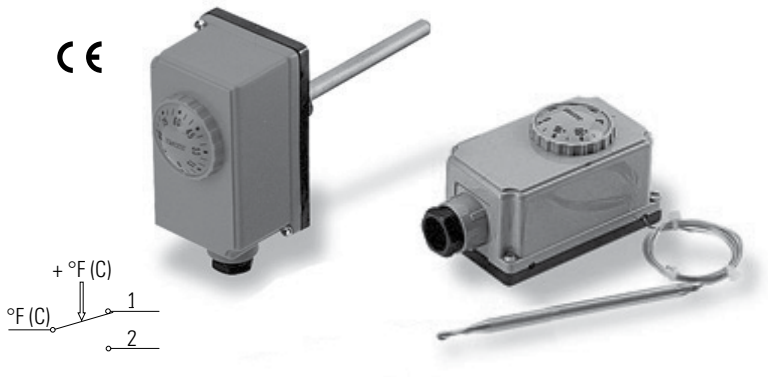
ACCESSORIES

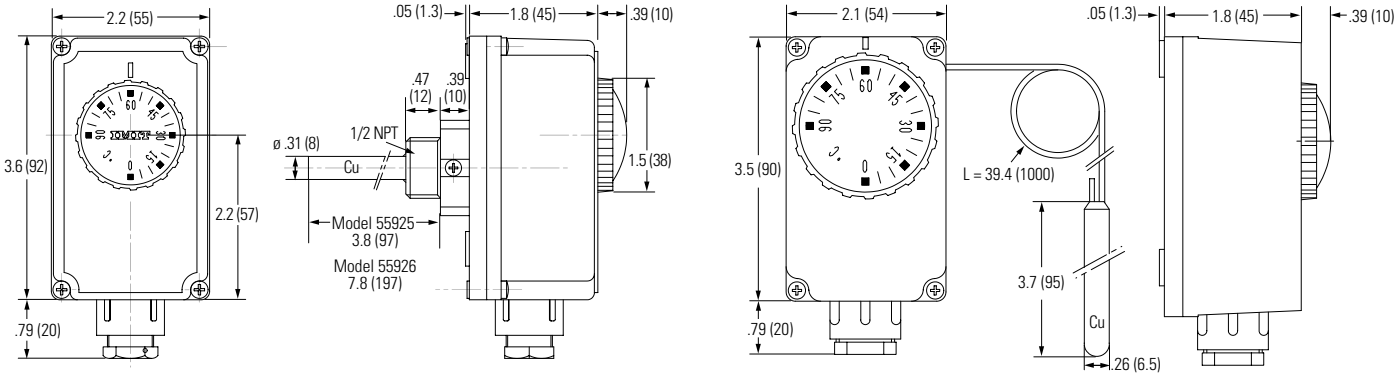
Electronic Temperature Sensors

Low Cost, Simple Setup

Immersion thermostat, measuring temperature with a liquid filled sensing element. SPDT contacts, complete with waterproof protection pocket. Used to measure temperature on the primary heating pipe circuit, it is particularly suitable for automatic adjustment pumps.

- Contacts rating: 10(2,5)A/250V~
- Contacts: switching or closing contact for temperature increase
- Maximum head temperature: 176°F (80°C)
- Maximum bulb temperature: 257°F (125°C)
- Temperature rate of change: 1° K/min
- Protection degree: IP40





All dimensions in inches (millimeters), unless noted otherwise.

Part Number	Temperature Range	Differential	Maximum Bulb Temperature	Capillary Length	Protection Pocket 1/2" NPT	Copper Bulb
55925	0°/194°F (0°/90°C)	Δt = 4 ± 1K	266°F (130°C)	NA	.27x.31x4" (7x8x100 mm)	NA
55926	0°/194°F (0°/90°C)	Δt = 4 ± 1K	266°F (130°C)	NA	.27x.31x8" (7x8x200 mm)	NA
55927	0°/194°F (0°/90°C)	Δt = 4 ± 1K	266°F (130°C)	39" (1000 mm)	NA	Ø .26x3.7" (6.5x95mm)

PB2P Fan Controller

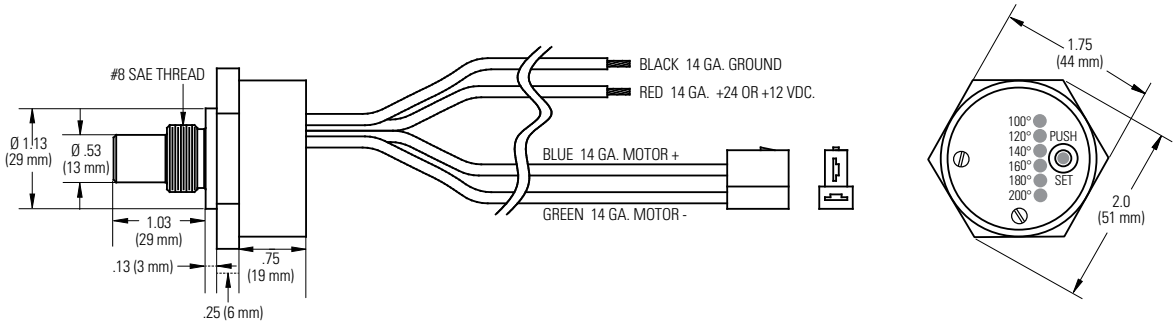
Compact Programmable Temperature Sensor

Part Number 55959

This combined sensor and controller is designed to mount directly to the Heat Exchanger. It provides accurate temperature control by cycling the electric cooling fan to maintain desired oil temperature. The single housing reduces wiring and mechanical installation. A push-button and set of LEDS is provided to indicate and select the oil temperature setting.

Features

- 12 or 24 volt DC operation up to 25 amps.
- Temperature sensor and controller in single aluminum housing.
- Select from 6 temperature settings from 100 to 200°F (38 to 93°C)
- Mounts directly to the cooler.
- Connector to fan is included and pre-wired.
- Solid-state design, no moving parts, fully sealed.
- Manual override feature built-in (all LEDs lit).
- Shuts off 5°F below set point.

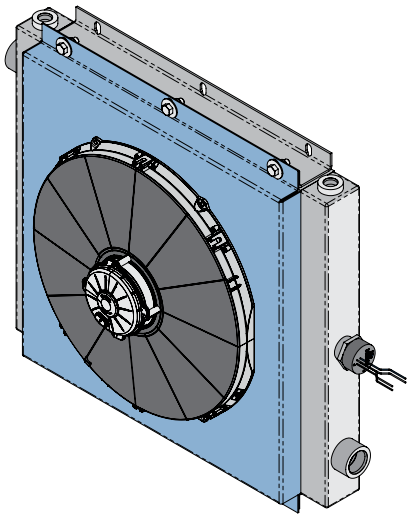


Specifications

Operating Voltage	12 or 24 VDC Systems
Min/Max Voltage	9 VDC / 32 VDC
Current Rating	25 AMPS
Switch Type	Normally open, Low side
Ambient Operating Temperature	-40° to +185° F (-40° to +85° C)
Measurement Temperature Range	-40° to +239° F (-40° to +115° C)
Current Draw	20 mA
Setpoint Selections	100°, 120°, 140°, 160°, 180°, 200° F
Selection method	Pushbutton and LEDS
Enclosure Rating	IP69K
Sealed Housing	High-grade Automotive Potting Compound
Housing Material	Anodized Aluminum
Weight	Approx 8 oz. (.23 kg) incl. wire
Mounting	#8 SAE Thread
Fan Connector	2 Conductor Receptacle

Installation

1. Insert controller sensor into #8 SAE sensor port on cooler.
2. Connect controller to DC fan (see wire diagram above).
3. Connect DC power to controller (see wire diagram above).
4. Push button to set controller to desired temperature.



Brushless DC
Pulse Width Modulation (PWM) Sensor

For use with Brushless DC Fan Option

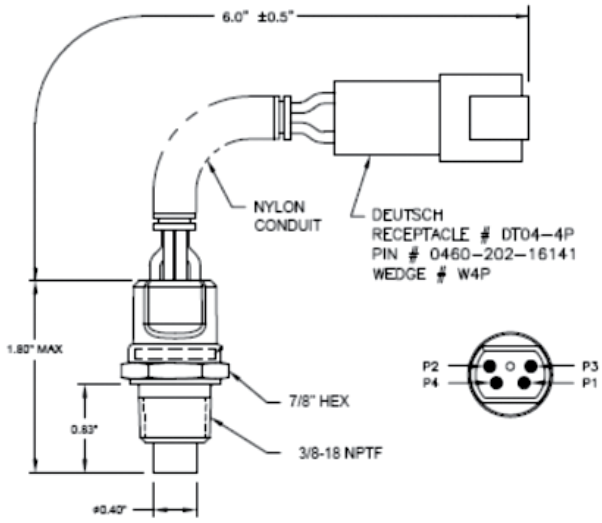
Variable Output Temperature Control

Function 1 - Output (Fan): Switch to control brushless fan speed over temperature span shown
Function 2 - Input (Override): (+) input switch – maximum fan speed bypass
Can control 1-10 brushless fans in parallel.

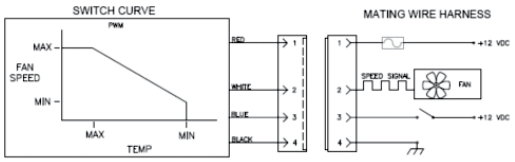
Specifications

Electrical Ratings	Functions 1 & 2
Maximum steady state current	1 amps inductive or resistive
Maximum steady state supply voltage	32 volts DC
Minimum required supply voltage	9 volts DC
Recommended fusing	5 amps
Operating temperature range	-40°F to 257°F (-40°C to 125°C)
Exposure temperature range	-40°F to 257°F (-40°C to 125°C)
Installation torque	14 newton-meters (10 ft lbs)
Lead wires	18 awg. SXL

- When coupled with a wiring harness, this sensor will control 12v brushless motor fans based on the temperature at the sensor element (fluid).
- The blue wire override function is intended to bypass the current requested operation of the fan and increase the fan rpm to its maximum output. Override switch not provided with the harness, sensor, or brushless fans.
- Only use the brass hex portion of the sensor for tightening. Do not use the sensor base for tightening.
- The sensor will operate a 12v brushless motor fan with a fan temperature turn on (at lowest rpm). The fan rpm will increase as the temperature increases and will reach its full on (maximum rpm).

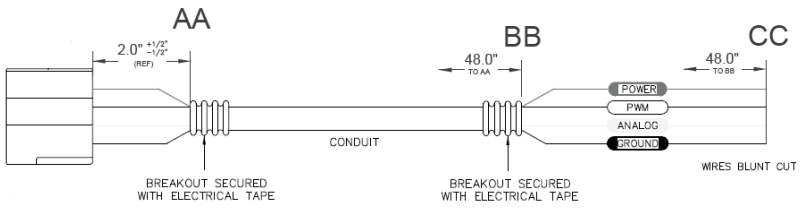


Wiring Diagram

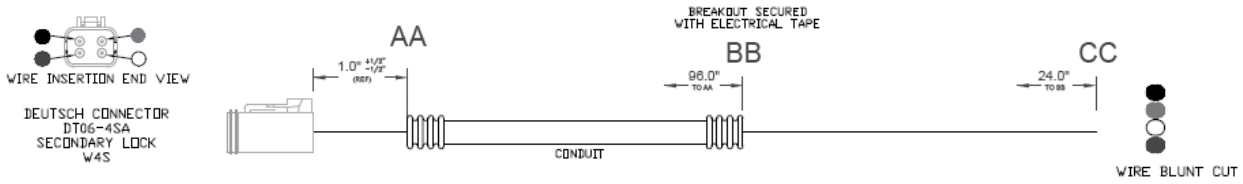


Part Number	Temperature Range
56975-140-165	140°F (60°C)-165°F (74°C)
56975-165-185	165°F (74°C)-185°F (85°C)
56975-190-215	190°F (88°C)-215°F (102°C)

Brushless DC Fan Wiring Harness
Part Number 56977

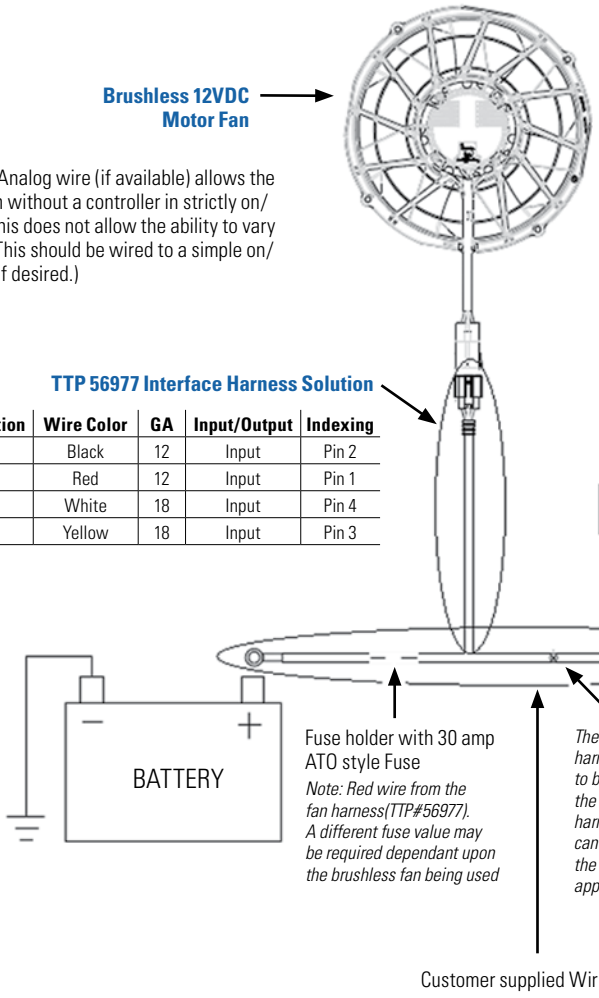


Brushless DC PWM Sensor Wiring Harness
Part Number 56978



ttpsales@apiheattransfer.com 262.554.8330 www.thermaltransfer.com

Brushless DC Wiring Diagram



The yellow Analog wire (if available) allows the motor to run without a controller in strictly on/off mode. This does not allow the ability to vary the speed. This should be wired to a simple on/off switch (if desired.)

TTP 56977 Interface Harness Solution

Wire Function	Wire Color	GA	Input/Output	Indexing
Ground	Black	12	Input	Pin 2
Power	Red	12	Input	Pin 1
Pwm	White	18	Input	Pin 4
Analog	Yellow	18	Input	Pin 3

TTP 56978 Interface Harness Solution

Wire Function	Wire Color	GA	Indexing
Ground	Black	16-18	Pin 4
Power	Red	16-18	Pin 1
Pwm	White	16-18	Pin 2
Override	Blue	16-18	Pin 3

Compressed Air Separators

S-50 and S-100 Models

Two Models:

One with a built-in automatic float style drain, the second with a 1/8" NPT connection with manual shut off valve. Rugged cast zinc housing. Equipped with quick disconnect bowls for easy service.

S-200 thru S-1700 Models

Four models to fit most applications. Unique high efficiency design provides wide SCFM capacity range without loss in performance. Sturdy, lightweight aluminum construction for long dependable service. NPT threaded drain connection for installation of an electronic, manual or automatic float style drain. Low differential pressure at maximum flow ratings. Externally and internally epoxy painted for maximum corrosion protection.

Model S-2600-M/S-2600-4F

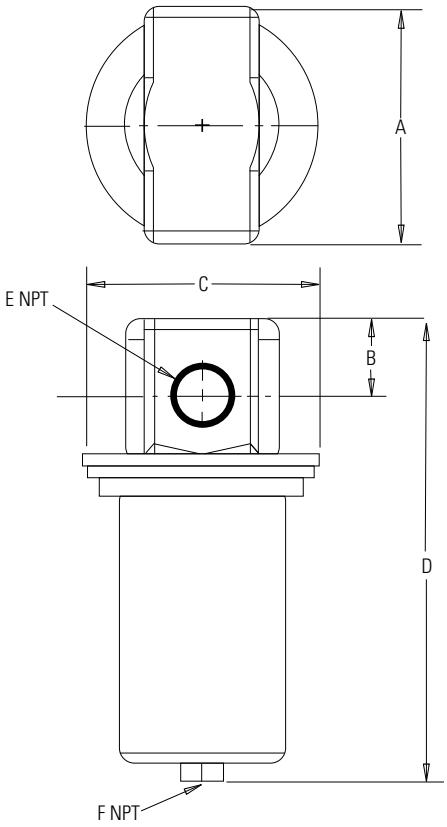
1500 thru 3500 SCFM capacity. Consult factory for details on larger models thru 16,000 SCFM. (S-2600-4F shown above.)

MAINTENANCE

1. Depressurize unit before removing bowl.
2. A. If unit is equipped with a manual petcock, drain bowl at least once per workshift. More frequent draining may be required

   B. If unit is equipped with an automatic float drain attached to the bowl, clean by turning bowl upside down, tapping on table top, and blow clean with airblow gun.
3. If bowl seal is cracked, damaged, or deteriorated, replace with approved seal.

Compressed Air Separators



Dimensions

MODEL NUMBER	A	B	C	D	E (NPT)	F (NPT)	WEIGHT LBS.
S-50 M	3.25	0.98	3.25	7.20	1/2"	1/8"	2.9
S-50 AD	3.25	0.98	3.25	7.35	1/2"	1/8"	3.1
S-100 M	4.62	1.00	4.75	10.00	1"	1/8"*	6.0
S-100 AD	4.62	1.00	4.75	10.00	1"	1/8"	6.0
S-200 M	5.10	1.60	4.38	10.80	1"	1/2"	4.8
S-300 M	6.70	2.00	4.38	17.00	1-1/2"	1/2"	11.2
S-600 M	6.70	2.00	6.00	17.00	2"	1/2"	11.2
S-1700 M	8.10	2.40	7.75	19.90	3"	1/2"	22.00
S-2600 M	13.75	7.25	8.62	30.50	4"	3/4"	85
S-2600 4F	16.75	7.25	8.62	30.50	4" Flg	3/4"	100

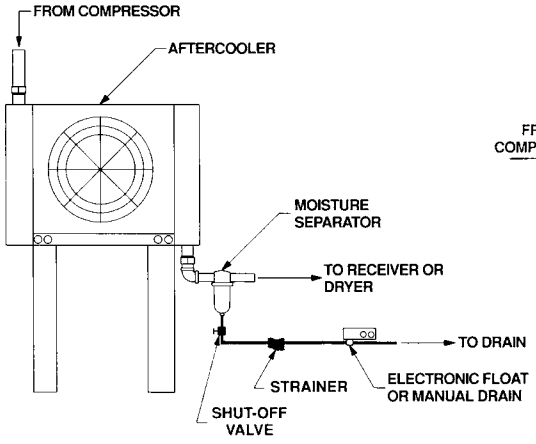
**Supplied with manual shut off valve.*

Specifications

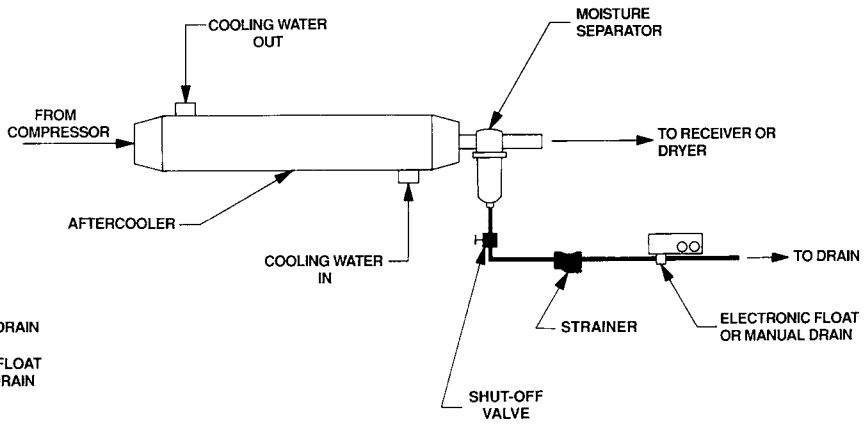
MODEL NUMBER	SCFM RANGE 100 PSIG MIN.	MAX	△P AT MAX SCFM	PSI MAX	TEMP °F MAX	BOWL TYPE	DRAIN TYPE
S-50 M	5	50	0.5	200	175	Cast Zinc	Manual
S-50 AD	5	50	0.5			Cast Zinc	Automatic with Internal Float
S-100 M	11	120	0.5			Cast Zinc	Manual
S-100 AD	11	120	0.5			Cast Zinc	Automatic with Internal Float
S-200 M	11	233	0.7	232	176	Aluminum	Manual
S-300 M	60	472	1.0			Aluminum	Manual
S-600 M	100	742	1.3			Aluminum	Manual
S-1700 M	260	1700	1.0			Aluminum	Manual
S-2600 M	1500	3500	1.5	150	350	Carbon Steel	Manual
S-2600 4F						Carbon Steel	Manual

MINIMUM OPERATING TEMPERATURE - 35°F
Specifications and dimensions subject to change without notice.

Recommended Typical Installation

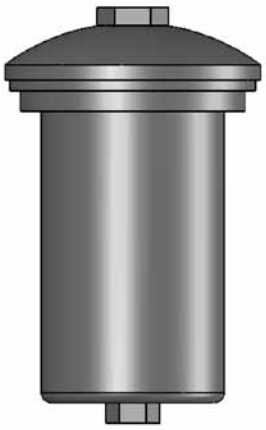


Air Cooled Equipment



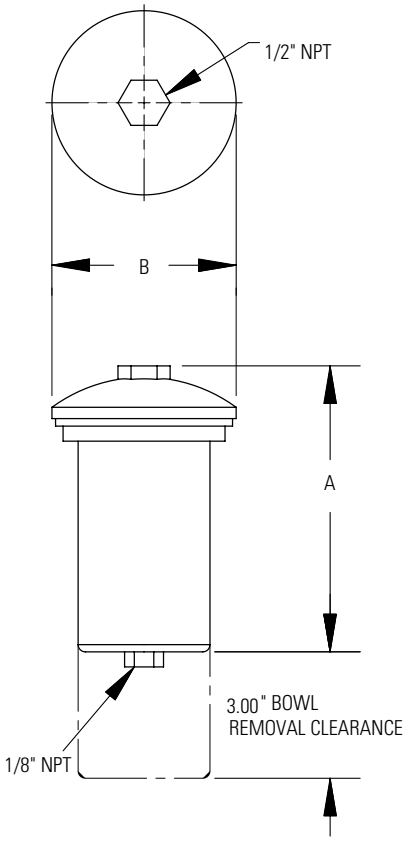
Water Cooled Equipment

Automatic Float Drain



FD-25 and FD-50 Models

Two Models to fit most applications. Rugged zinc cast housing. Equipped with quick disconnect bowls for easy servicing. Economical cost.



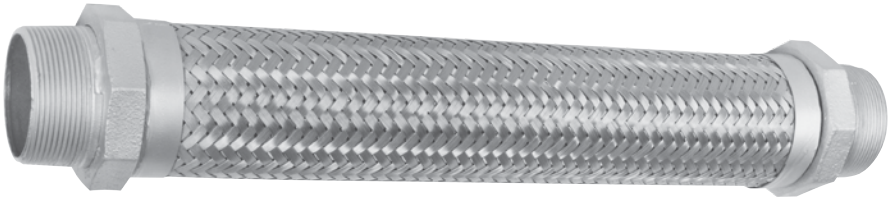
Dimensions

MODEL NUMBER	A	B
FD-25	4.75	3.06
FD-50	8.50	4.75

Specifications

MODEL NUMBER	PART NUMBER	PSI MAX	TEMP °F MAX	WEIGHT LBS (APPROX)
FD-25	66278	200	175	2.0
FD-50	66279			5.0

Flexible Metal Hose



Features

Designed to isolate damaging vibration, dampen noise and absorb thermal expansion from pumps and compressors to other related equipment. Hose is of corrosion resistant type 304 stainless steel. Connectors are carbon steel schedule 40 external NPT with hex nut attachments on both ends for easy installation. Couplings are welded to assure dependable leak free operation.

Specifications & Dimensions

PART NUMBER	CONNECTIONS NPT	HOSE INSIDE DIAMETER	OVERALL LENGTH	WORKING PRESSURE PSI			FITTING LENGTH (EACH END)	SHIPPING WT (APPROX)
				AT 70°	AT 300°	AT 400°		
67492	.5	.5	10	1000	900	863	2.00	2.0
66271	1.0	1.0	12	525	460	435	1.75	2.0
66272	1.5	1.5	16	450	395	370	2.00	3.0
66273	2.0	2.0	18	400	350	330	2.00	4.5
66274	2.5	2.5	20	285	250	235	2.50	8.5
67442	3.0	3.0	22	265	230	220	3.00	12.5
66275	4.0	4.0	24	260	225	215	4.00	14.5

All dimensions are inches. Maximum operating temperature 1500°F. Other sizes and lengths available—consult factory.

Dimensions

PART NUMBER	DESCRIPTION
67492	.5 x 10 Flex Hose
66271	1 x 12 Flex Hose
66272	1.5 x 16 Flex Hose
66273	2 x 18 Flex Hose
66274	2.5 x 20 Flex Hose
67442	3 x 22 Flex Hose
66275	4 x 24 Flex Hose

All shipments FOB Racine, WI USA

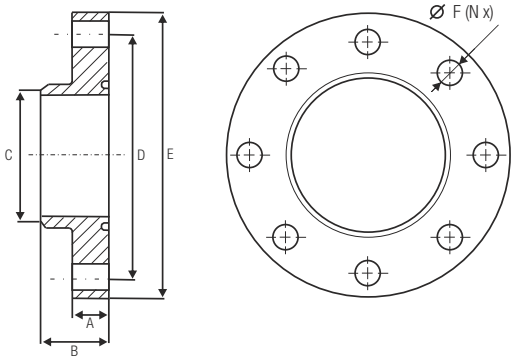
Installation

The satisfactory performance of flexible hoses is dependent upon certain precautions which must be taken at the time of installation.

1. Install the flexible hose directly on the pump, compressor or other equipment. If this is not practical, install as close as possible to the source of vibration.
2. **Do not** compress, twist or stretch during installation. Premature failure will result.
3. Flexible hoses must be installed so that its length is perpendicular to the direction of the vibration.
3. Support piping as needed to eliminate stress to the flexible hose. It must support only its own weight.

Counter Flanges

To increase the flexibility for units with standard threaded connections, TTP offers a range of compact flanges. The threaded part is easily assembled to the connections and the counter flange welded to your pipe.



Dimensions

Part No.	Size	A	B	C	D	E	F
56811	DN20C	.39	.79	1.06	2.09	2.80	.43
56812	DN25C	.39	.79	1.33	2.48	3.31	.51
56813	DN50C	.47	.94	2.37	3.58	4.41	.51
56814	DN65C	.47	.94	3.00	4.17	4.91	.51
56815	DN80C	.59	1.18	3.50	4.65	5.55	.51
56816	DN100C	.59	1.18	4.50	5.67	6.50	.51
56817	DN150C	.87	1.73	6.63	8.54	9.84	.51

Ratings *(according properties of gasket)*

Maximum Working Pressure	580 psi
Minimum Working Temperature	5ºF
Maximum Working Temperature	392ºF

Materials

Stainless Steel

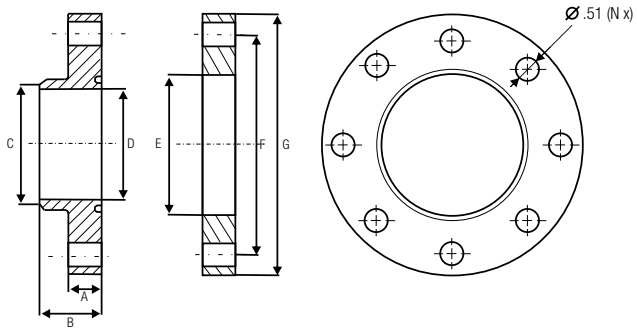
Carbon Steel flanges available. Consult factory for additional information.

Standard Connections

TTP counter flanges are used to connect your pipe to our compact flanges on the BPHE unit.

Flange Kits

To increase the flexibility for units with standard threaded connections, TTP offers a range of compact flange kits. The threaded part is easily assembled to the connections and the counter flange welded to your pipe.



Dimensions

Part No.	Size	A	B	C	D	E	F	G	N
56818	2"	.47	1.46	DN50	1.54	G2"	3.58	4.41	.31
56819	2½"	.47	1.46	DN65	2.36	G2½"	4.17	4.92	.31

Ratings *(according properties of gasket)*

Maximum Working Pressure	580 psi
Minimum Working Temperature	5ºF
Maximum Working Temperature	392ºF

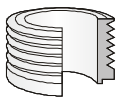
Materials

Stainless Steel

Carbon Steel flanges available. Consult factory for additional information.

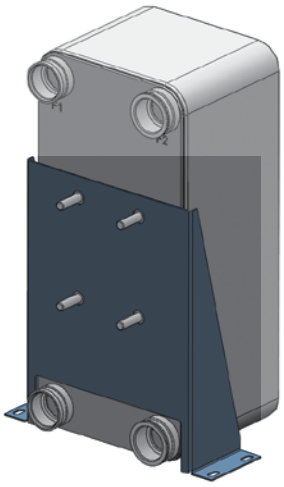
Standard Connections

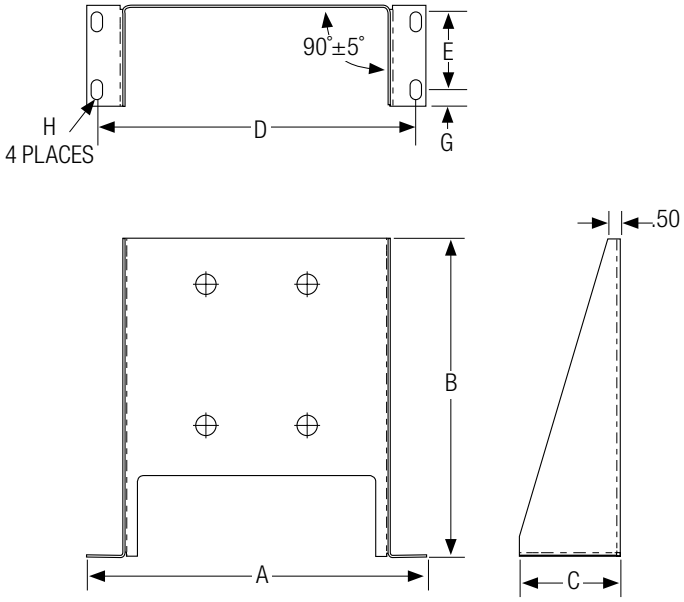
Screw-on flanges are used to convert our ISO-G connections to weld neck compact flanges.



Foot Mounting Bracket

Optional Foot Mounting Bracket for **BPSW** and **BPW** Series (except 8x3 plates).
Constructed of Carbon Steel.





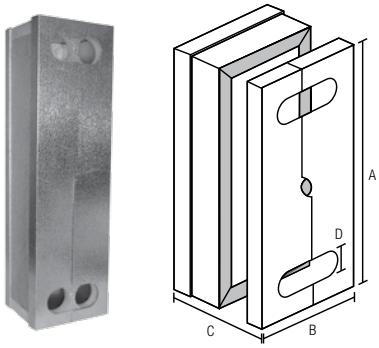
Mounting bracket for location purposes only. Bracket is not designed to support entire weight of the cooler. Customer to add extra support if necessary.

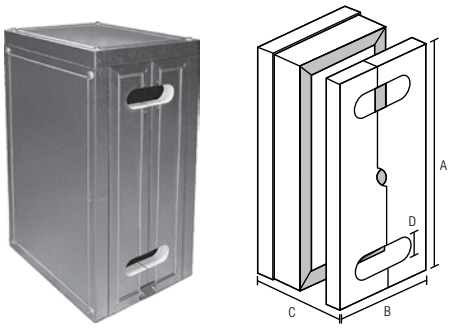
Part No.	Plate Size	A	B	C	D	E	G	H
56839	12x5 (305x127)	7.99 (203)	9.35 (237)	3.15 (80)	7.17 (182)	1.77 (45)	0.69 (18)	.40 x .59 (10 x 15)
56840	20x5 (508x127)	7.99 (203)	15.65 (398)	3.15 (80)	7.17 (182)	1.77 (45)	0.69 (18)	.40 x .59 (10 x 15)
56841	15x5 (381x127)	7.99 (203)	12.74 (324)	3.15 (80)	7.17 (182)	1.77 (45)	0.69 (18)	.40 x .59 (10 x 15)
56842	15x10 (381x254)	13.20 (335)	12.40 (315)	3.94 (100)	12.40 (315)	2.64 (67)	0.65 (17)	.40 x .75 (10 x 15)
56843	20x10 (508x254)	13.51 (343)	14.37 (365)	3.94 (100)	12.72 (323)	2.64 (67)	0.65 (17)	.40 x .75 (10 x 15)
56844	28x10 (711x254)	13.20 (335)	21.30 (541)	3.94 (100)	12.40 (315)	2.64 (67)	0.65 (17)	.40 x .75 (10 x 15)

All dimensions are in inches (millimeters), unless noted otherwise.

Insulation

BPSW and **BPW** Series insulation boxes for heating applications.





Dimensions

Part No.	A	B	C* (Approx.)	D	Thickness
56820	9.33	4.72	1.26 + .09 x NoP	1.18	.79
56821	13.11	6.38	2.00 + .09 x NoP	1.97	.79
56822	16.61	6.46	2.13 + .09 x NoP	1.97	.79
56823	16.61	6.46	2.17 + .09 x NoP	1.97	.79
56825	17.28	11.34	2.17 + .10 x NoP	3.54	.79
56826	22.52	11.34	2.68 + .09 x NoP	3.54	.79
56827	22.52	11.34	2.17 +. 10 x NoP	3.54	.79

**Only available in selected 20th NoP (20, 40, 60, etc). NoP = Number of Plates.*

Rating

Maximum Working Temperature	302°F
Thermal Conductivity	0.013 BTU/HrFtF°
Fire Properties	B2 in accordance with DIN 4102
Color	Silver

Materials

Insulation	Polyurethane rigid foam
Insulation Cover	Aluminum

Dimensions

Part No.	A	B	C* (Approx.)	D	Thickness
56828	26.78	18.11	9.13 + .09 x NoP	3.15	1.97
56829	37.80	17.32	9.84 + .10 x NoP	3.35	1.97
56830	27.95	18.90	10.24 + .09 x NoP	3.74	1.97

**Only available in selected 20th NoP (20, 40, 60, etc). NoP = Number of Plates.*

Rating

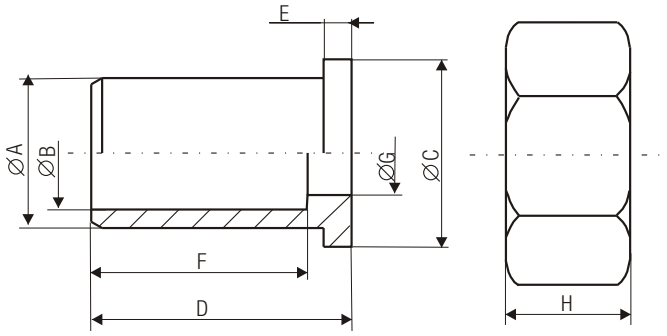
Maximum Working Temperature	302°F
Thermal Conductivity	0.014 BTU/HrFtF°
Fire Properties	B2 in accordance with DIN 4102
Color	Silver

Materials

Insulation	Rigid expanded polyurethane
Insulation Cover	Aluminum

COSD Connection for Soldering

For standard thread-connections of TTP BPHE, the welding sleeve with union nut can be used to connect pipes with the connection of the heat exchanger. According to the quality of the used medium, the welding sleeve can be chosen in carbon or stainless steel. The soldering connection consists of a union nut, a gasket and a soldering sleeve. COSD connections are suitable for **refrigerant applications.**



Dimensions

Part No.	Nominal diameter	A	B	C	D	E	F	G	H	Opening of the spanner
56831	¾"	.86	.71	.94	.67	.12	.57	.59	.63	1.18
56832	1"	1.02	.87	1.18	.75	.12	.59	.75	.67	1.42
56833	1¼"	1.38	1.10	1.52	.98	.12	.79	.98	.71	1.81
56834	2"	1.90	1.65	2.20	1.26	.16	1.02	1.54	.94	2.56
56835	2½"	2.36	1.13	2.83	1.46	.19	1.22	2.00	1.02	3.35

The used gasket has a thickness of .079" (2mm)

Materials

Union nut	MS58
Soldering sleeve	Rg5
Gasket	Hecker-Centellen WS 3820