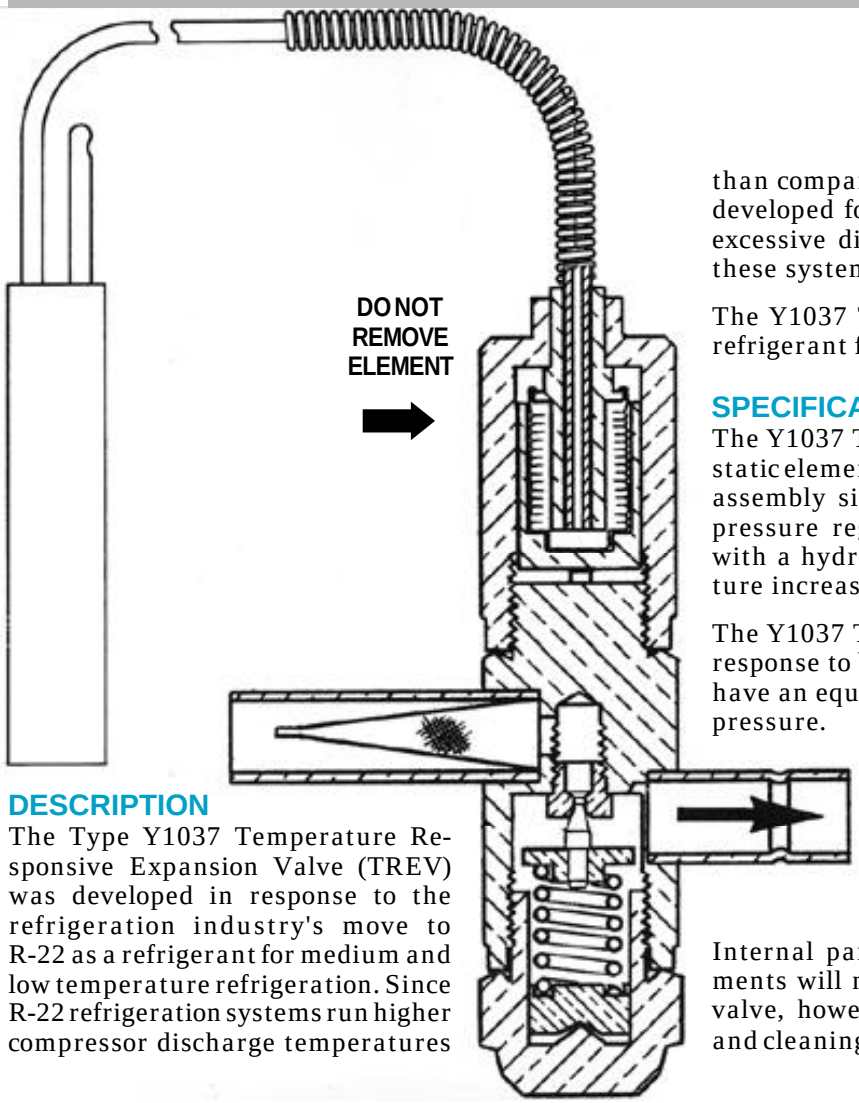
Y1037
Temperature Responsive Expansion Valve

Bulletin 10-10-2
February 1994



DESCRIPTION

The Type Y1037 Temperature Responsive Expansion Valve (TREV) was developed in response to the refrigeration industry's move to R-22 as a refrigerant for medium and low temperature refrigeration. Since R-22 refrigeration systems run higher compressor discharge temperatures than comparable R-12 and R-502 systems, a need has developed for an expansion valve which will prevent excessive discharge temperatures from occurring on these systems.

The Y1037 TREV solves this problem by modulating refrigerant flow in response to bulb temperature only.

SPECIFICATIONS & OPERATION

The Y1037 TREV uses the Type F body and a thermostatic element consisting of a sensing bulb and a bellows assembly similar to the direct acting ORI and CRO pressure regulating valves. The element is charged with a hydraulic fluid which expands as its temperature increases.

The Y1037 TREV modulates the flow of refrigerant in response to bulb temperature only. The valve does not have an equalizer connection, and is not influenced by pressure.

INSTALLATION AND SERVICE

When brazing solder type connections, it is recommended that a wet rag, chill block, or some other means be used to prevent excessive heating of the valve body.

Internal parts kits or replacement thermostatic elements will not be available for the Y1037 TREV. The valve, however, may be disassembled for inspection and cleaning when necessary. **Do not remove element.**

Y1037 QUICK SELECTION CHART*

Nominal Valve Capacity - Tons

COMPRESSOR H P	EVAPORATOR TEMPERATURE (°F)						
	- 40				- 20		
	SUCTION VAPOR TEMPERATURE ENTERING COMPRESSOR (°F)						
	0	20	40	65	20	40	65
2	1/3	1/3	1/3	1/3	1/3	1/3	1/3
3	1/3	1/3	1/3	1/3	1/3	1/3	1/3
5	1/3	1/3	1/3	1/3	1/3	1/3	1/3
7-1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2
10	1/2	1/2	1	1	1/2	1/2	1
15	1/2	1/2	1	1	1/2	1/2	1
20	1/2	1/2	1-1/2	1-1/2	1/2	1/2	1
30	1	1	1-1/2	2	1/2	1	1-1/2

Selection based on R22, 100°F liquid and 10°F bulb temperature change
*For selections at conditions other than listed above see reverse side.

TYPICAL DESIGNATION

Y1037-FV-1-230° 3/8 ODF x 3/8 ODF

CAPACITY RATINGS AND SELECTION PROCEDURES

Ratings for R-22 are listed below. Ratings are in tons of refrigeration, and they are based on 100°F liquid refrigerant entering the valve, and an opening bulb temperature change of 10°F.

EVAPORATOR TEMPERATURE - 0°F to - 40°F							
PRESSURE DROP - psi >		125	150	175	200	225	250
NOMINAL CAPACITY (tons)	1/3	0.25	0.27	0.30	0.32	0.34	0.35
	1/2	0.35	0.39	0.42	0.44	0.47	0.50
	1	0.56	0.62	0.67	0.71	0.76	0.80
	1-1/2	0.88	0.97	1.04	1.12	1.18	1.25
	2	1.23	1.35	1.46	1.56	1.65	1.74
	3	1.76	1.93	2.08	2.23	2.36	2.49
	5	2.74	3.01	3.25	3.47	3.68	3.88

LIQUID TEMPERATURE CORRECTION FACTORS							
TEMP (0°F)	0°	20°	40°	60°	80°	100°	120°
FACTOR	1.56	1.45	1.34	1.23	1.12	1.00	0.88

The valve's setting is the bulb temperature at which the valve will begin to open. Rated valve capacity occurs at 10°F above the bulb temperature at which the valve begins to open. The ambient temperature in which the valve operates may have a small influence on the valve's opening point.

Selection Example:

R-22, 2 tons
Condensing temp: 110°F
Liquid temp: 110°F
Evaporator temp: - 20°F

At these operating conditions, a suction vapor temperature of 40°F (60°F superheat) is expected, and a maximum temperature of 240°F at the TREV bulb is desired.

Capacity required from the TREV may be determined from the chart shown below. This chart lists the percentage of system capacity to maintain a 240°F bulb temperature given evaporator temperature and expected suction vapor temperature.

Evaporator Temperature (°F)	Suction Vapor Temperature (°F)				
	- 20	0	20	40	65
- 20	0	0	3	8	14
- 40	2	7	12	17	23

Values assume:

110°F condensing temperature
discharge temp = isentropic compression + 80°F
TREV bulb temp = isentropic compression + 30°F

In this case, 8 percent of the system capacity is required, or 2 x 0.08 = 0.16 tons.

Pressure drop across TREV:

Condensing pressure (psig) 226
Evaporator pressure (psig) 10
216 psi

Liquid correction factor: 0.94

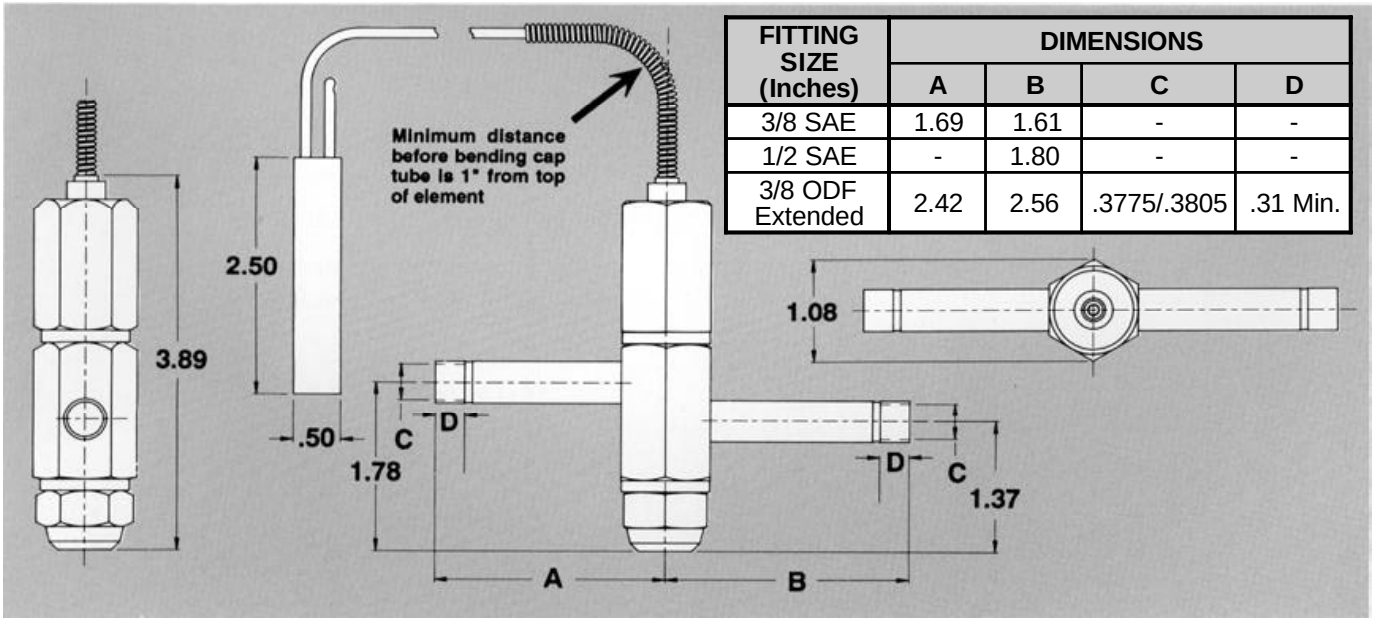
$\frac{0.16 \text{ tons}}{0.94}$ = 0.17 tons corrected to 100°F liquid

Y1037-FV-1/3 = 0.33 tons at 216 psi

$$\% \text{ loading} = \frac{0.17 \text{ tons}}{0.33 \text{ tons}} = .52 \text{ or } 52\%$$

The actual TREV bulb temperature can be estimated as follows: 10°F x 0.52 = 5.2°F, or approximately 5°F. Therefore, a 240°F valve setting would control at approximately: 240°F + 5°F = 245°F. The control temperature may actually be slightly higher due to cooling effects of ambient temperature on the valve body. As a result, **actual tests must be performed to verify the valve controls at the desired bulb temperature.**

DIMENSIONS



FITTING SIZE (Inches)	DIMENSIONS			
	A	B	C	D
3/8 SAE	1.69	1.61	-	-
1/2 SAE	-	1.80	-	-
3/8 ODF Extended	2.42	2.56	.3775/.3805	.31 Min.