Ranco Varifix Specifications

Model	K-Series Model	Cold Out	Cold In	Warm Out	Warm In	Defrost Temp	Signal Operation	Capillary
VC1	K50-P1110	-23	-14.5	--	2	--	--	1200 mm
VA2	K50-P1174	-18	-14.5	--	3.5	--	--	2000 mm
VF3	K50-P1117	-34	--	-16.5	-12	--	--	2000 mm
VP4	K60-P1013	-25	--	-10.4	-4	5.5	--	1200 mm
VS5	K54-P1102	-34	--	-16.5	-12	--	cuts in 5° above cut in	2 000 mm
VR6	K54-P3100	-34	--	-16.5	-12	--	cuts out 5° above cut in	2 000 mm
VB7	K50-P1118	-3	2	--	12.5	--	--	1200 mm
VW8	K55-L5010	15	18	--	34	--	--	1200 mm
VT9	K59-L1102	-26	--	-11	--	3.5*	--	1200 mm
VT93	K59-P1662	-26	--	-11	--	3.5*	--	3000 mm
VX0	K59-P1620	-15	--	-5	--	3.5*	--	1500 mm
VTD9	K61-P2505	-26.9	--	-14.3	--	4.8*	--	1000 mm

* Constant Cut-In Controls
All Temperatures are in Degrees Celcius

Ranco P30 Specifications
Differential Oil Pressure Control

P30 Model	Delay Time* Seconds	Pressure Settings (kPa)			Connections	
		C.O.P.D Range	C.O.P.D Factory Settings	C.I.P.D. - C.O.P.D	Male Flare	Capillary Tube**
P30-3601	60 ± 15	70 - 400	70	50		•
P30-3701	90 ± 20	70 - 400	70	50		•
P30-3801	120 ± 20	70 - 400	70	50		•
P30-5826	120 ± 20	60 Fixed	60	50		•
P30-5827	120 ± 20	60 Fixed	60	50	•	

* Timing at 230VAC, Ambient 24°C with Cover Assemb led in Place
** Capillary Length 915mm

invensys Controls

RANCO

O Temperature Controls

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"O" SERIES TEMPERATURE CONTROLS

COLD/AMBIENT AIR THERMOSTATS

These units incorporate a small air sensing coil, and are used where the requirement is to mount the complete control within the area being monitored. Since the majority of commercial refrigeration applications involve cold rooms, ice and occasional defrosting, it is often recommended that air coil thermostats have splash proof enclosures to IP66. O52 range is therefore very popular in these applications. Ranco air coil thermostats are available with fixed or adjustable differentials (narrow differentials are popular on air coil thermostats, as opposed to pressure controls where wide differentials are popular to avoid short compressor cycles).

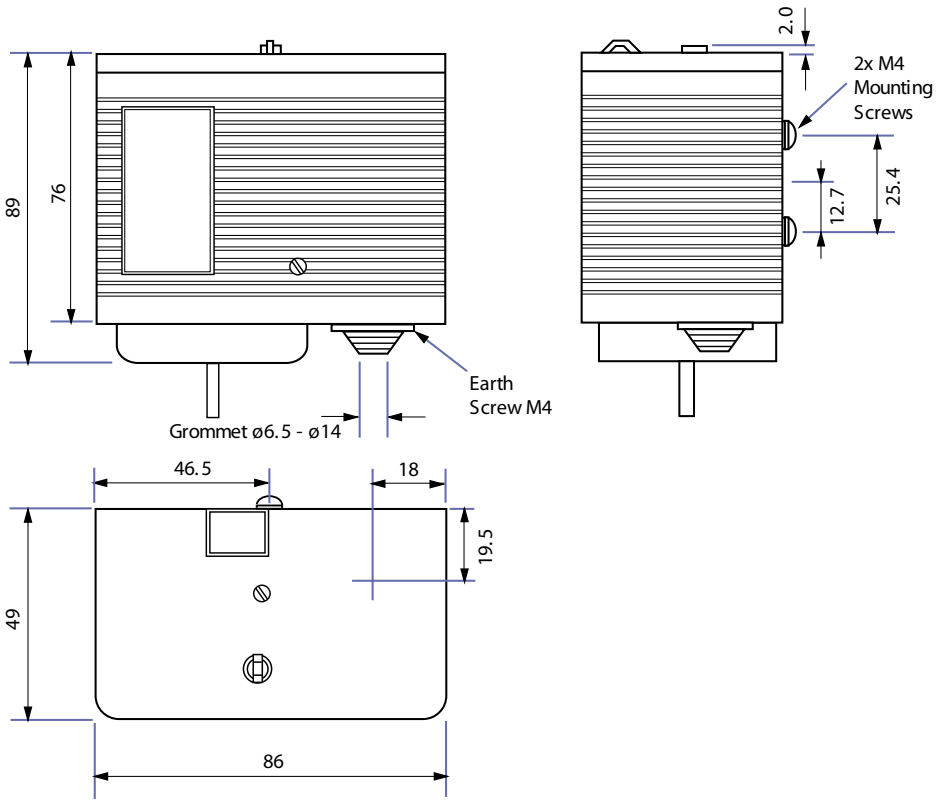
STRAIGHT AND COILED CAPILLARY THERMOSTATS

These controls are used on applications where it can be guaranteed that the sensing element is always colder than the control head. The sensing element used senses along the complete length. Where local sensing is required the coiled end version is used, whereas the straight version is used to sense over longer distance, e.g. across an evaporator coil. The only difference between the straight and coiled capillary thermostats is the coiling of the last few centimetres of sensing element. Available in standard (IP44), or splash proof (IP66) housing, and with adjustable differentials. Models with built-in 'stop' switches can be selected where a shut-down of the system from the thermostat location is required, without altering the setting.

CROSS AMBIENT THERMOSTATS

These thermostats have a capillary and remote bulb. Unlike the straight or coiled capillary modules, these controls sense only at the bulb. They should be used on all applications where it is possible that the control head or capillary can be at a lower temperature than the sensing bulb, e.g. external applications where the bulb senses a defrosting coil. Ranco cross ambient thermostats fall into two categories/ narrow range, narrow differential and wide range, wide differential. Please note that these have different bulb sizes. Special ranges, differentials and bulb sizes can be made, subject to normal commercial considerations.

016 STANDARD



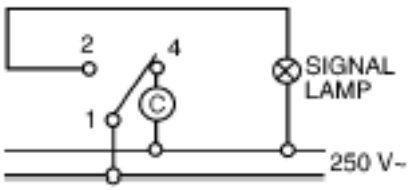
APPLICATIONS

Commercial Refrigeration applications including:

- Vending Machines
- Cold Rooms
- Cool Stores
- Air conditioning Units
- Refrigeration Compressor Controls
- Ice banks

WIRING DIAGRAM

NOTE: FUSE RATING 16 AMPS



INSTALLATION CONSIDERATIONS

1. Mount control on a flat surface to prevent distortion of the control case. Ensure sufficient room to connect capillaries and adjust controls.
2. Mount control in an environment commensurate with the control enclosure.
3. Wiring should be routed to prevent the possibility of water running along cables into the control.
4. Wiring should conform to any applicable approvals, codes and industry practice. Electrical ratings must not be exceeded.
5. Capillaries should be secured to prevent excessive vibration, and must not be twisted or kinked. Any bends must have a minimum radius of 25 mm (1inch).
6. The bellows must be held with a spanner while tightening flare-nut(s).
7. If mounting brackets not manufactured by Ranco are used, ensure gauge of material used is sufficient to avoid amplification of any vibration.

DESIGN FEATURES

Optional Lockable top plate

Enclosure Rating - Standard IP44, IP66 version available code 052

Cover screw - allows easy cover removal without possible screw loss

Universal mounting

O16 Manual reset trip free to prevent dangerous 'jamming' by unauthorised personnel

O16 "Toggling" Lever allows simple manual operation, avoiding damage or electric shocks

Adjustment screws Range and differential screws (knob available as optional extra for all models)

Setting indicator for increased accuracy

Bellows Laser welded capsulated stainless steel on temperature controls

Chassis Heavy duty plated steel frame, tempered steel mechanisms, and precision ground springs

No CFC or toxic gas filled temperature actuators

TECHNICAL DATA

Cold Room / Ambient Air Thermostats:

- Scale: °C
- Temperature Sensor Dimensions: Aircoil 49 mm max. x 43 mm max

Straight and Coiled Capillary Thermostats:

- Scale: °C
- Capillary Length: Straight 2000 mm Coiled 2000 mm + Coil
- Temperature Sensor Dimensions: Coiled Capillary 9,5 mm x 38 mm Cross Ambient

Cross Ambient Thermostats

- Scale: °C
- Capillary Length: 1800 mm including bulb
- Temperature Sensor Dimensions: Cross Ambient Fill 14,5x140 mm Wide range 9,5x152 mm

DIFFERENTIAL

The differential is the difference between the cut-in and cut-out point for a given setting. Because of the characteristics of the 'fill' of version, the differential can vary across the range.

ADJUSTMENT

By hexagonal nut incorporating cross headed screwdriver slot on both range and differential spindles. An adjustable knob is available and is standard on some O52 temperature versions.

TERMINALS

O16 and O52: 1 Common - 2 Break on rise - 4 Make on rise

CABLE ENTRY

- O16 14 MM Grommet
- O52 P.G. 16 Connector

REFRIGERANTS

Suitable for use on all gases

MOUNTING

Two tapped holes on reverse of control to accept M4x6 mm screw (provided)

ELECTRICAL RATINGS

The SPDT switch used on all O16 controls, is rated at:

- 16 (16) A 250V~ Normally open or normally close.
- 1 (1) A 250V~ on other side

Due to local approval requirements governing certain applications the approval ratings by country are:

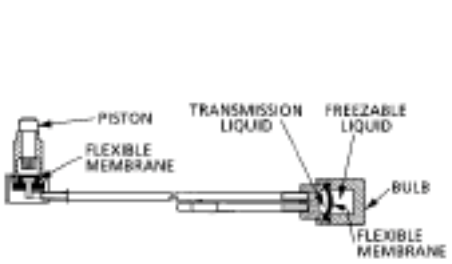
- Germany (VDE)
- Denmark (DEMKO)
- Norway (NEMKO)
- Finland (FEI) 16 (16) A 250V~
- Switzerland (SEV)
- Sweden (SEMKO) 16 (12) A 250V~

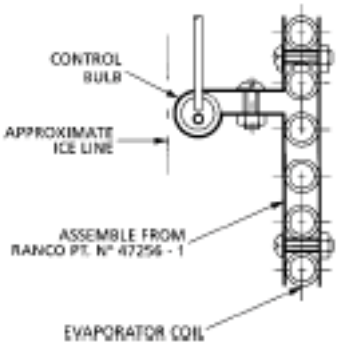
Special Versions Only:

- USA (UL)
- Canada (CSA) 17 FLA 102 LRA 250V~

ICE BANK CONTROL O16-H6999

On systems which use an "ice bank" for thermal storage, an ice bank control is used to cycle the system. This unique control uses a bulb filled with water. When the ice grows and surrounds the bulb, the water in the bulb freezes and expands. This expansion is transmitted to the control mechanism through a liquid filled capillary to open the control switch. The switch may cycle the compressor directly, or on larger systems close the refrigerant solenoid valve to start the pump-down cycle. Ice banks are used to provide reserve thermal capacity on medium temperature refrigeration or air conditioning equipment. By building a reserve of ice during the off-peak periods, the system can use this "cooling" reserve during peak operating periods. By drawing on the ice bank, the system can use a much smaller compressor than would be needed normally to meet the peak demand. Ice storage is generally used for applications such as drink dispensers or milk coolers.
In general, however, ice banks can be used for many medium temperature applications where cooling demand fluctuates widely.





Ranco O-Series Temperature Controls Specifications

O-Series Model	Temperature Range	Differential Range	Differential Type	Capillary Type	Bulb/Coil Dimension	Capillary Length
Ambient Thermostats - with air coil attached						
O16-6904	-35 to +7	1 to 10	Adjustable	Air Coil	49mm DIAM X 43mm	--
O16-6905	-18 to +13	1 to 10	Adjustable	Air Coil	49mm DIAM X 43mm	--
O16-6907	-35 to +9	1 to 12	Adjustable	Air Coil	49mm DIAM X 43mm	--
Cross-Ambient Thermostats - with capillary and bulb						
O16-6930	-34 to +32	3 to 22	Adjustable	Bulb	9.5mm DIAM X 152mm	1800 mm
O16-6980	-18 to +13	2 to 12	Adjustable	Bulb	14.5mm DIAM X 140mm	1800 mm
O16-6981	-5 to +25	2 to 12	Adjustable	Bulb	14.5mm DIAM X 140mm	1800 mm
O16-6983	-10 to +40	2 to 12	Adjustable	Bulb	14.5mm DIAM X 140mm	1800 mm
Cross-Ambient Thermostats - with straight capillary or coiled end						
O16-6921	-35 to -7	2 to 12	Adjustable	Straight	--	2000 mm
O16-6922	-18 to +13	2 to 12	Adjustable	Straight	--	2000 mm
O16-6924	-5 to +25	2 to 12	Adjustable	Straight	--	2000 mm
O16-6950	-35 to -7	2 to 12	Adjustable	Coiled End	9.5mm DIAM X 38mm	2000 mm
O16-6951	-18 to +13	2 to 12	Adjustable	Coiled End	9.5mm DIAM X 38mm	2000 mm
O16-6954	-5 to +25	2 to 12	Adjustable	Coiled End	9.5mm DIAM X 38mm	2000 mm
O16-8900	-18 to +13	4 to 30	Adjustable	Coiled End	9.5mm DIAM X 38mm	2000 mm

All Temperatures and Differentials in Degrees Celsius

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RANCO

O Pressure Controls

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"O" SERIES SINGLE AND DUAL PRESSURE CONTROLS

O17 Dual Pressure Control

Single Pressure Controls are classified Into two basic types: high or low pressure. All O16 and O52 controls incorporate SPDT switches. Therefore, all models are make or break on rise or fall of pressure according to which terminals are selected. Where there is a requirement for automatic cycling to be prohibited, all models are available with manual reset. Low pressure controls trip the manual reset mechanism on a drop in pressure, and high pressure controls on a rise.

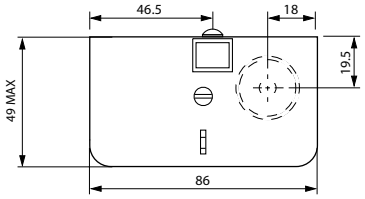
T.U.V. bellows are available on certain high pressure models. In this configuration the models incorporate a "bellows within a bellows", designed so that if the operating bellows develops a leak, the second bellows contains the refrigerant and shuts off the system. Braze connection versions are available with or without capillary.

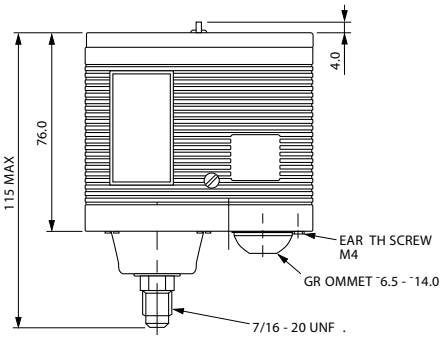
Pressure Specifications
Scale: p.s.i. and Bar (T.U.V. versions Bar only) Pressure Connections: straight outlet male connection 7/16 - 20 UNF connect 1/4 female flare.

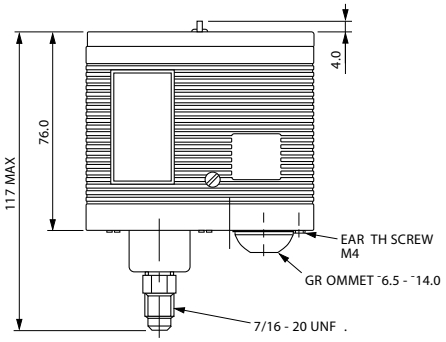
Dual Pressure Controls offer the combination of high and low pressure control, and/or limit functions, in one unit. These controls are available as standard or T.U.V. models. In either case, this range offers:

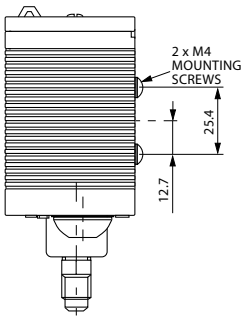
a. automatic cycling on high and low pressure;
b. manual reset high and low pressure;
c. automatic low pressure cycling with manual reset high pressure limit;
d. easy installation. Both high and low pressure functions operate one switch;
e. the 4000 series Dual Signal Switch has an independent signal for both low and high pressure operation. The system clearly defines which side (low or high pressure) has caused the compressor shut down;
f. braze tube versions are available with or without capillary.

O16 STANDARD

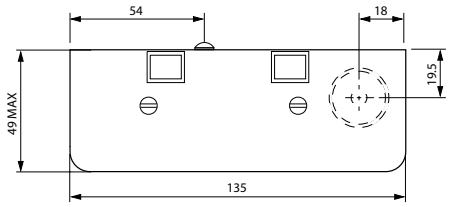


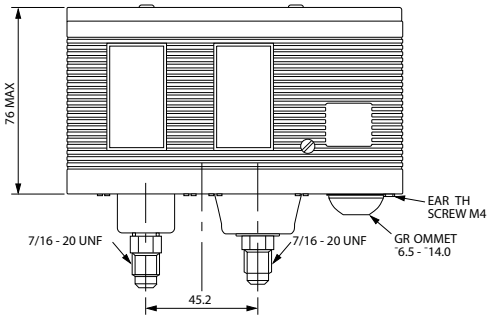


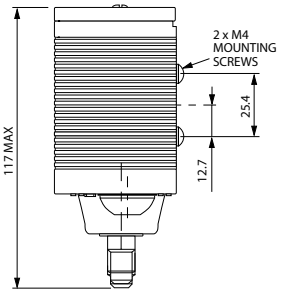




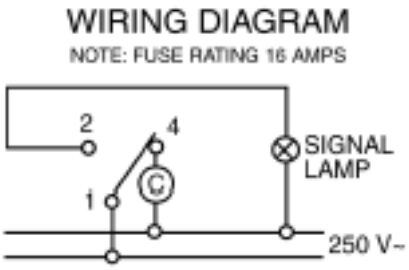
O17 STANDARD



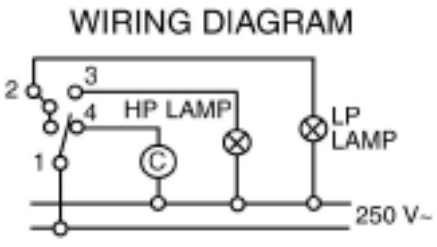




O16 and standard O17



O17 dual signal switch



INSTALLATION CONSIDERATIONS:

1. mount control on a flat surface to prevent distortion of the control case. Ensure sufficient room to connect capillaries and adjust controls;
2. mount control in an environment commensurate with the control enclosure;
3. wiring should be routed to prevent the possibility of water running along cables into the control;
4. wiring should conform to any applicable approvals, codes and industry practice. Electrical ratings must not be exceeded;
5. capillaries should be secured to prevent excessive vibration, and must not be twisted or kinked. Any bends must have a min. radius of 25 mm (1 inch);
6. the bellows must be held with a spanner while tightening flare-nut(s);
7. if mounting brackets not manufactured by Ranco are used, ensure gauge of material used is sufficient to avoid amplification of any vibration.

TECHNICAL DATA

O16 AND O17 MODELS:
Electrical Ratings:
the SPDT switch used on all O16/O17 controls except the O17 dual signal version, is rated at:
- 16(16)A 250V~ normally open or normally closed
- 1(1)A 250V~ on the other side

Conformity:
'O ' series controls are approved to EN60730-2-6 and EN60730-2-9, and manufactured in accordance with ISO9001, and conform with relevant European directives.

Special Versions Only:
USA (UL) - Canada (CSA): 17 FLA 102 LRA 250V AC

For O17 Dual Signal Switch Version:
ratings as above terminals 1 and 4. However, across terminals (1 and 2) and (1 and 3) maximum current is 0.1A, i.e. 0.1A 250V~

Terminals:
O16 and standard O17:
1 Common
2 Break on rise
3 -
4 Make on rise (O16)
Make on rise of L.P.O17
Break on rise of H.P.O17

O17 dual signal switch:
1 common;
2 make of signal circuit on fall of L.P.;
3 make of signal circuit on rise of H.P.;
4 make on rise of L.P., break on rise of H.P.

Cable Entry:
- O16/O17 14 mm Grommet
- O52 P.G.16 Connector

Refrigerants:
suitable for use on all gases. Pressure controls for use with ammonia are available on request.

Mounting:
two tapped holes on reverse of control to accept M4x6 mm screw (provided). See accessories for mounting brackets.

Range and "lowest event":
the lowest operating point of which the control is capable is called the "lowest event". The ranges shown in the tables indicate the "lowest event" in brackets. This figure shows the lowest condition at which the switch will function. Combination of setting and differential should not be made which would exceed the lowest event figure.

Dual Pressure Controls offer the combination of high and low pressure control, and/or limit functions, in one unit. These controls are available as standard or T.U.V. models. In either case, this rage offers:
a. automatic cycling on high and low pressure;
b. manual reset high and low pressure;
c. automatic low pressure cycling with manual reset high pressure limit;
d. easy installation. Both high and low pressure functions operate one switch;
e. the 4000 series Dual Signal Switch has an independent signal for both low and high pressure operation. The system clearly defines which side (low or high pressure) has caused the compressor shut down;
f. braze tube versions are available with or without capillary.

TECHNICAL DATA (cont)

Scale Pointer:
on Low Pressure auto reset controls the pointers show where terminals 1 and 4 make. On all High Pressure controls the pointer shows where terminals 1 and 2 break. On Low Pressure manual reset controls the pointer shows where terminals 1 and 2 break. Dual controls follow the above on high and low sides.

Differential:
the differential is the difference between the cut-in and cut-out point for a given setting. Because of the characteristics of the 'fill' of temperature versions, the differential can vary across the range.

Adjustment:
by hexagonal nut incorporating cross headed screwdriver slot on both range and differential spindles. An adjustment knob is available (see accessories) and is standard on some O52 temperature versions (consult instruction sheet, packed with control, before installation).

Ranco O-Series Pressure Controls Specifications

O-Series Model	High Press OR Low Press	Reset Mode		Pressure Range		Differential Range		Differential Type		Connection
		HP	LP	HP	LP	HP	LP	HP	LP	
Single Controls - Low Pressure										
O16-8705	LP	--	M	--	-30 to 700	--	60	--	Fixed	*
O16-8706	LP	--	A	--	-30 to 700	--	60 to 400	--	Adjustable	*
O16-8713	LP	--	A	--	-30 to 700	--	60 to 400	--	Adjustable	**
Single Controls - High Pressure										
O16-8750	HP	A	--	700 to 3000	--	250 to 800	--	Adjustable	--	*
O16-8751	HP	M	--	700 to 3000	--	320	--	Fixed	--	*
Dual Pressure Controls										
O17-8701	HP and LP	A	A	700 to 3000	-30 to 700	350	60 to 400	Fixed	Adjustable	*
O17-8703	HP and LP	M	M	700 to 3000	-30 to 700	350	60	Fixed	Fixed	*
O17-8705	HP and LP	M	A	700 to 3000	-30 to 700	350	60 to 400	Fixed	Adjustable	*
O17-8711	HP and LP	A	A	700 to 3000	-30 to 700	350	60 to 400	Fixed	Adjustable	**

All Pressures and Differentials are in kPa
A = Auto
M = Manual
LP = Low Pressure
HP = High Pressure

* Male Connection 7/16" - 20 UNF for a 1/4" Female Flare
** Capillary Connection 1m long 1/4" Flare Fitting with Nut

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