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Product catalogue 2012/13

Electromechanical controllers



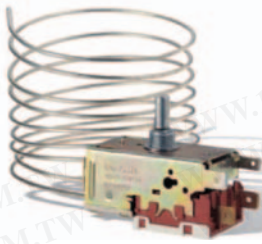
Electromechanical controllers

The controllers and components included in this catalogue, well-known on the market for their reliability and quality of manufacture, are designed especially for use in refrigeration and air-conditioning as well as residential, commercial and industrial comfort applications.

Contents

K series thermostats.....p.	2
Varifix series aftermarket thermostats....p.	3
V35-V61 gas valves for refrigerators.....p.	4
V85 gas valves for refrigerators.....p.	5
Paragon 2001 defrost timer.....p.	6
W35 thermostats.....p.	8
C17 thermostats.....p.	9
J10 humidity controls.....p.	10
E37-L56 ice controls.....p.	12
O16-O52 thermostats.....p.	14
O16H6999 ice bank controls.....p.	16
O16-O52 pressure switches.....p.	17
O17 pressure switches.....p.	18
G60-G63 fixed setting pressure switches...p.	20
SnapDisk fixed setting pressure switches...p.	22
P30 oil pressure switches.....p.	24
RK30 oil level controls.....p.	25
V-N-VH reversing valves.....p.	27
PXV pulse valves.....p.	31
EWPA transducers.....p.	35
EWHS transducers.....p.	37
Temperature probes.....p.	38





Applications

Ranco K series thermostats are used for temperature control in the commercial refrigeration, residential refrigeration, air conditioning and heating sectors globally.

Technical specifications

Application range between -40 °C/-40 °F and 90 °C/194 °F (depending on models)

Faston terminals 6,3 or 4,8

Electrical rating 6 or 16A at 250V~ (depending on models)

Standard mounting or with bracket

Capillary lengths from 300 to 3000 mm available, different forms or bulb available

Available in "break device" version for application with explosive gases (depending on models)

Approved by main international bodies

	K22	K36	K50 / K14	K52	K54	K55	K56	K57	K58	K59	K60	K61
Thermostat with SPDT exchange contact	*	*										
Thermostat with cycling ON-OFF switch (SPST)		*	*	*	*	*	*	*	*	*	*	*
Thermostat with high rating (16A)	*	*				*						
Thermostat with two sensors				*								
Thermostat with signal operation					*		*		*			
Thermostat with auxiliary OFF							*	*		*		*
Thermostat with quick freeze button									*			
Thermostat with constant connection										*		
Thermostat with defrost button											*	
Thermostat for heating application		*										
Thermostat with break device			*		*			*		*		



Applications

Varifix thermostats are designed especially to facilitate the replacement of refrigeration controllers on site. The model indicates the typical intended use.

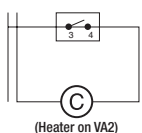
Common features

Electrical rating: 6A inductive at 250V~ (VW8 16A inductive at 250V~) VS5/VR6 0,1A signal contacts.

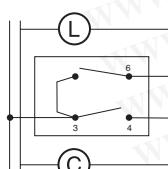
Model	Part number	Application	specifications									
			capillary mm	cold cut-out	cold cut-in	warm cut-out	warm cut-in	defrost	signal	terminals faston (mm)	packaging (pcs/box)	
VC1	K50P1110	1 door refrigerator	1200	-23.5	-14.5		2				6.3	50
VC101	K50H1104	1 door refrigerator	1200	-22.5		-5	2				4.8	80
VC110	K50H1108	bottle refrigerator	2000	-12	-4		4				4.8	80
VA2	K50P1174	absorption refrigerator	2000	-18	-14.5		3.5				6.3	50
VA102	K50H1105	absorption refrigerator	1200	-18	-14.5		3.5				4.8	80
VF3	K50P1117	freezer no signal, ice cream cabinet	2000	-34		-16.5	-12				6.3	50
VF103	K50H1106	freezer no signal, ice cream cabinet	2000	-32		-16.5	-12				4.8	80
VP4	K60P1013	1 door refrigerator with manual defrost	1200	-25		-10	-4	5.5			6.3	50
VP104	K60L2024	1 door refrigerator with manual defrost	1600	-19		-11	-1	7.5			4.8	50
VP111	K60L2025	2 door refrigerator with manual defrost	1500	-31		-13	-5	5			4.8	50
VS5	K54P1102	freezer with active signal	2000	-34		-16.5	-12		5° (above warm cut-in)		6.3	50
VS105	K54H1404	freezer with active signal	2000	-34		-16.5	-12		5° (above warm cut-in)		4.8	80
VR6	K54P3100	freezer with passive signal	2000	-34		-16.5	-12		5° (above warm cut-in)		6.3	50
VR106	K54H3400	freezer with passive signal	2000	-32		-20	-15		5° (above warm cut-in)		4.8	80
VB7	K50P1118	liquid refrigerator, bottle refrigerator	1200	-3	2		12.5				6.3	50
VB107	K50H1107	liquid refrigerator, bottle refrigerator	2000	-3	2		12.5				4.8	80
VT9	K59L1102	2 door refrigerator	1200	-26	3.5	-11	3.5				6.3	50
VT93	K59P1662	2 door refrigerator	3000	-26	3.5	-11	3.5				6.3	50
VI109	K59H1303	2 door refrigerator	2000	-21	4.5	-6.5	4.5				4.8	80
VI 112	K59H2805	2 door refrigerator	1500	-28	5	-11	5				4.8	80
VW8	K55L5010	air conditioner	1200	15	max diff 3.6		34				6.3	50
VX0	K59P1620	2 door refrigerator	1500	-15	3.5	-5	3.5				6.3	50
VG7	K50P1115	soft drinks refrigerator with positive temperatures	2000	1.5	4		11				6.3	50

K VARIFIX - Wiring diagrams

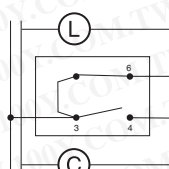
VC
VA
VF
VG
VW



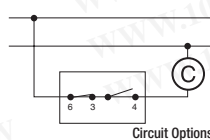
VS5



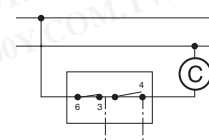
VR6



VX0/VT9 Replacement for Larder Refrigerator or 2 Door Cabinet

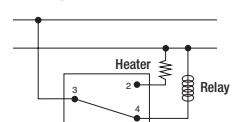


Control with "OFF" position for Heat Leakage Defrost



Control with "OFF" using Heater Assisted Defrost

VTD9



Control with Heater & Relay Controlling Compressor and By-pass Valve



Applications

The Paragon 2001 series of defrost timers are single-cam non-adjustable controllers having factory-set times and cycles, which are designed to operate an SPDT switch.

An internal clutch mechanism allows manual adjustment of the first timing/defrost sequence.

This same timing/defrost sequence will be repeated as long as the controller remains powered up.

Features/Advantages

- Low noise - Synchronous design ensures extremely quiet operation.
- Freedom of positioning - The timer can be mounted anywhere, and any way about.
- Totally enclosed - Patented snap-fit design of closure eliminates the use of external screws or nails.
- Lightweight - The timer weighs less than 90 grams (0.2 lb imperial).
- NEMA standard terminals- Four male terminals 0.032 by 0.250 (0.8 mm by 6.35 mm). Standard connector available.
- Interchangeability - Standard mounting configuration enables use in all applications.
- Low Power Consumption - Requires only 2 watts.
- Double insulated - No earth connection required.

Cycle selection tables - (other cycles available)

Standard duration of switch transfer in minutes			
Cycle	Minimum	Maximum	Tolerance
1 hour	2.0	8.0	± 1.0
2 hours	2.0	8.0	± 1.0
4 hours	7.0	32.0	± 3.0
5 hours	8.0	40.0	± 3.0
6 hours	10.0	48.0	± 3.0
8 hours	7.0	64.0	± 3.0 / ± 4.0
10 hours	8.0	80.0	± 3.0 / ± 5.0
12 hours	10.0	96.0	± 3.0 / ± 5.0
16 hours	14.0	64.0	± 4.0
24 hours	20.0	96.0	± 5.0

Special short duration versions*			
Cycle	Minimum	Maximum	Tolerance
4 hours	1.5	6.0	± 1.0
-	-	-	-
-	-	-	-
5 hours	1.9	7.5	± 1.0
6 hours	2.3	9.0	± 1.0
8 hours	1.5	12.0	± 1.0 / ± 2.0
10 hours	1.9	15.0	± 1.0 / ± 3.0
12 hours	2.3	18.0	± 1.0 / ± 3.0
16 hours	3.0	12.0	± 2.0
24 hours	4.5	18.0	± 3.0

*contact the sales department



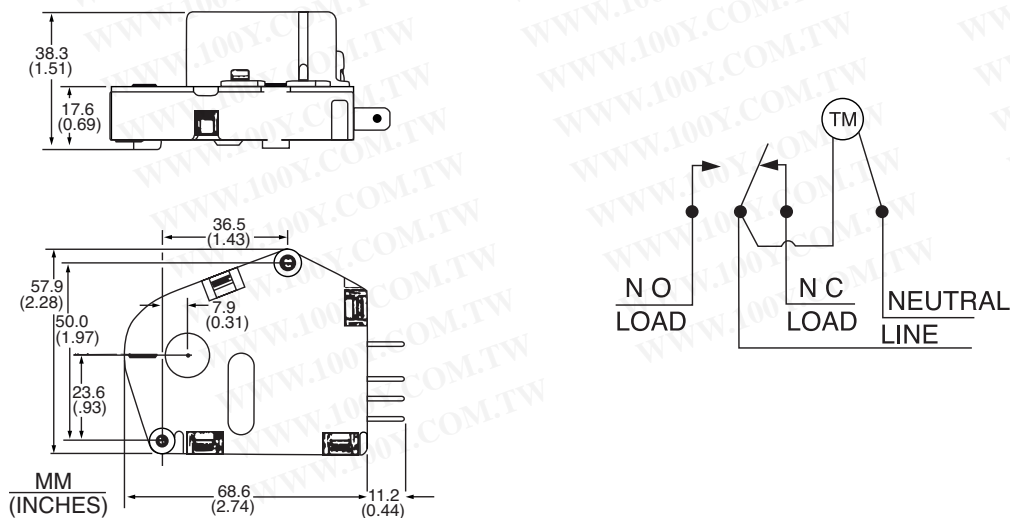
Electrical specifications

AC line voltage (+110%/-15%)	120V 50, 60 or 50/60 Hz 208-240V 50 or 60 Hz 100-120V 50 or 60 Hz
Power input	1/4 W or 2 W
Electrical output rating	1/3 or 1/2 HP a 120, 208-240V 10 or 15A at 120V 5A at 208-240V 125V~ On pilot load 16(6)A 208-240V (*) 16(8)A 208-240V (*) 9(3.6)A 208-240V (*) 5(3.6)A 208-240V (*) (*) depending on model

Technical specifications

Cam styles	Low with screwdriver slot, one way rotation Knurled, medium height Knurled, extra height
Mounting	Two 6-20 screws, type 25 Two clearance holes, 0.190 (4.8 mm)
Ambient temperature	Operation: 0 °C to 65 °C Transport: -30 °C to 70 °C Suitable for environments with normal pollution levels (*)
Recessed	A suitable recess for the device must have reinforced insulation
Component approved by:	UL and CSA EN 60730
Timing motor wiring	Neutral to line (shown) Neutral to load Normally Open Neutral to load Normally Closed (*) both in cam-actuator area and for terminals

Paragon 2001 series - Dimensions



W35 - SPDT multifunctional thermostat



Applications

The W35 thermostat automatically opens (hot version) or closes (cold version) the main contact, when the bulb sensing element registers the temperature value, which is set by the knob. When the temperature falls subsequently by the differential value (sdt is 3K), the contact is re-closed (hot version) or re-opened (cold version).

The controlled temperature is therefore kept within a minimum fluctuation range.

Technical data

Contact capacity - hot version: C-1 15(2.5)A@250V~ / C-2 2.5(0.4)A@250V~

Contact capacity - cold version: C-1 2.5(0.4)A@250V~ / C-2 15(2.5)A@250V~

Load control: ON-OFF type

Temperature variation at bulb: less than 1 °C/min

Life cycle: 100,000 cycles

Minimum current: 200mA without gold-plated contacts

Maximum temperature: 80 °C (body)

Maximum bulb temperature: +15% switching load (bulb)

Calibration range: see table

Dielectric strength: AC 2000V 1 min

Connections: FASTON 6.3x0.8 - screw

Type test standard: Internal thermostat to ENEC03

Enclosure rating: see table

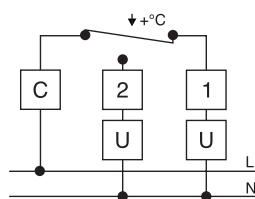
Insulation class: I

Available with built-in or remote sensor

Part number	Description	Enclosure rating
W3510C0150C00	Wall-mount thermostat -35 °C ...+35 °C, with 6.0x112 mm BULB and 1500 mm CAPILLARY - NICKEL PLATED	IP40
W3510H0150C00	Wall-mount thermostat 0 °C ...+90 °C, with 6.0x75 mm BULB and 1500 mm CAPILLARY - STAINLESS STEEL	IP40
W3510H3150C00	Wall-mount thermostat 0 °C ...+120 °C, with 6.0x75 mm BULB and 1500 mm CAPILLARY - STAINLESS STEEL	IP40
W3520C0000C00	Wall-mount thermostat -35 °C ...+35 °C, with 7.0x95 mm BULB ATTACHED	IP40
W3520H7000C00	Wall-mount thermostat 0 °C ...+40 °C, with 7.0x95 mm BULB ATTACHED	IP40
W3510C0150C00*	Wall-mount thermostat -35 °C ...+35 °C, with 6.0x112 mm BULB and 1500 mm CAPILLARY - NICKEL PLATED	IP54
W3510H0150C00*	Wall-mount thermostat 0 °C ...+90 °C, with 6.0x75 mm BULB and 1500 mm CAPILLARY - STAINLESS STEEL	IP54
W3510H3150C00*	Wall-mount thermostat 0 °C ...+120 °C, with 6.0x75 mm BULB and 1500 mm CAPILLARY - STAINLESS STEEL	IP54
W3520C0000C00*	Wall-mount thermostat -35 °C ...+35 °C, with 7.0x95 mm BULB ATTACHED	IP54
W3520H7000C00*	Wall-mount thermostat 0 °C ...+40 °C, with 7.0x95 mm BULB ATTACHED	IP54
W351NC0150C00	Bare thermostat -35 °C ...+35 °C, with 6.0x112 mm BULB and 1500 mm CAPILLARY - NICKEL PLATED	IP00
W351NH1150C00	Bare thermostat 0 °C ...+90 °C, with 6.0x75 mm BULB and 1500 mm CAPILLARY - STAINLESS STEEL	IP00
W351NH3150C00	Bare thermostat 0 °C ...+120 °C, with 6.0x75 mm BULB and 1500 mm CAPILLARY - STAINLESS STEEL	IP00

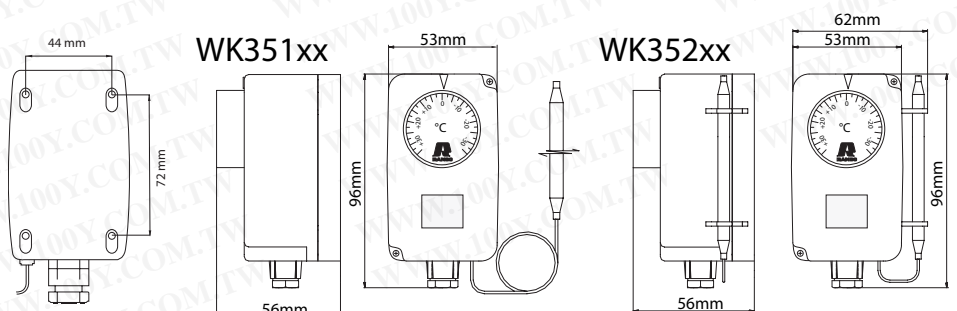
*contact Eliwell sales department

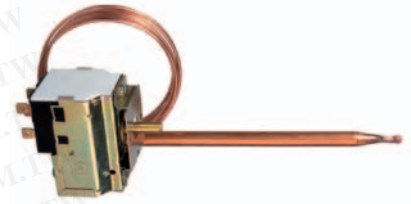
W35 - Wiring diagram



Thermostat should be earthed

W35 - Dimensions





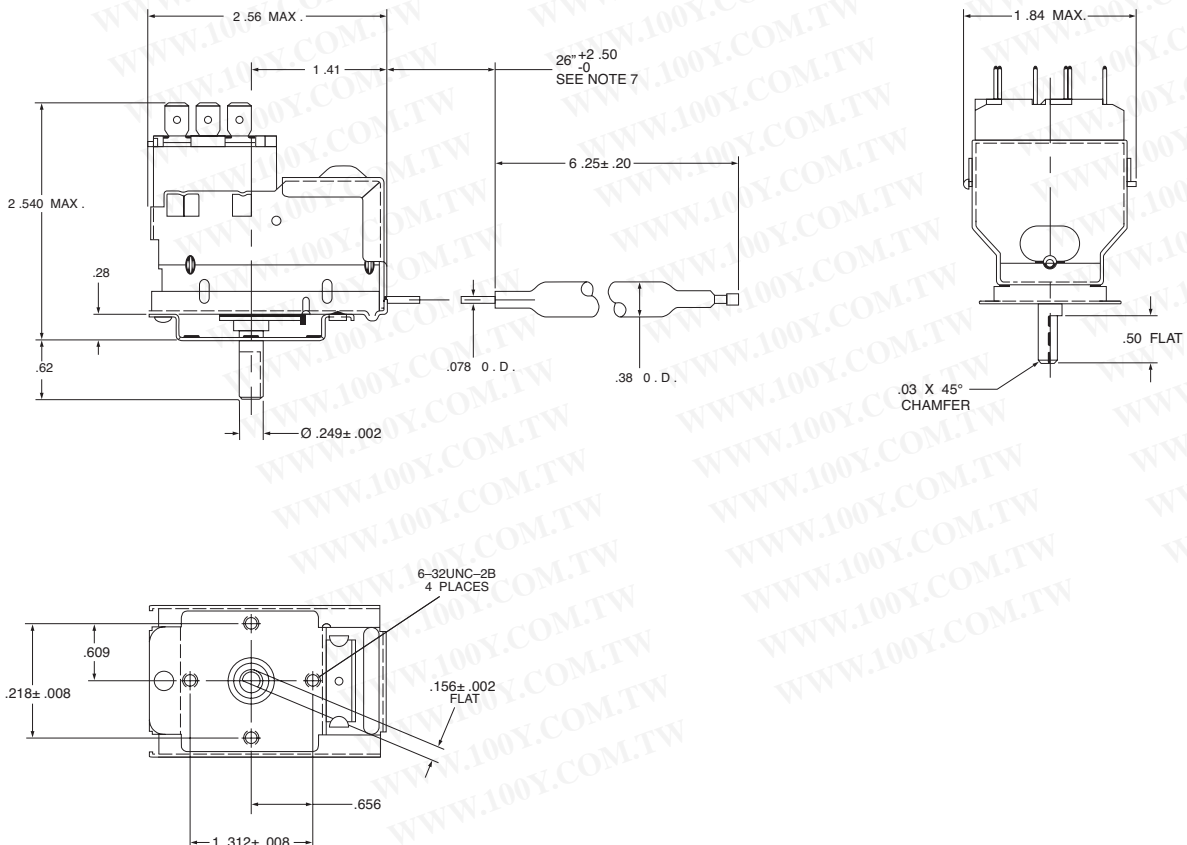
Applications

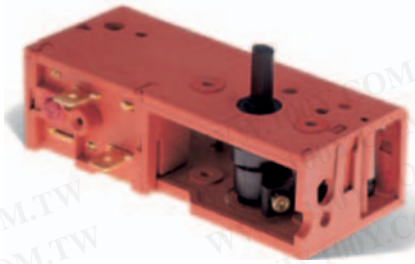
The C17 series of thermostats are two stage devices designed especially for air conditioning applications using stand-alone heat pump appliances and multiple compressor cooling systems.

Operating ranges and sensing element dimensions

Part number	F°	40	41	43	45	48	50	52	54	56	58	60	62	64	66	68	70	72	74	Dimensions in mm		
	C°	4	5	6	7	9	10	11	12	13	14	16	17	18	19	20	21	22	23	Capillary	Bulb ØxL	
C17-100																					660	9.65 x 178
202																					2,440	9.65 x 159
222																					762	11.94 x 131
257																					660	9.65 x 159
279																					1,525	9.65 x 178
281																					660	11.94 x 131
326																					1,067	9.65 x 208
2008																					660	9.65 x 178
2013																					762	11.94 x 136

C17 - Dimensions





Applications

J10 humidity controls are designed to regulate relative humidity in confined spaces by cyclic operation of humidifying or dehumidifying equipment. They are designed for use as internal components in portable humidifiers and dehumidifiers, and as wall mounted humidity controls for central humidification and dehumidification systems.

The J10 comprises a relative humidity sensing element, an adjustable set point cam, and an electrical switch.

The length of the sensing element varies in response to ambient relative humidity, and the resulting displacement pilots the operation of mechanisms controlling the relative switch contacts.

Typical applications

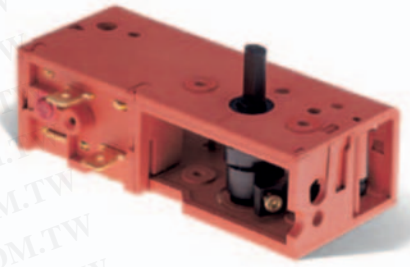
- Dehumidifiers
- Humidifiers for products and rooms
- Fans for confined spaces
- Processing of materials
- Central HVAC systems

Features and options

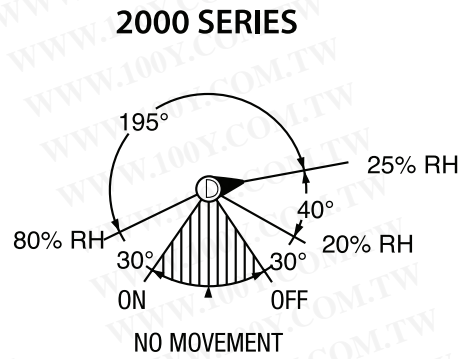
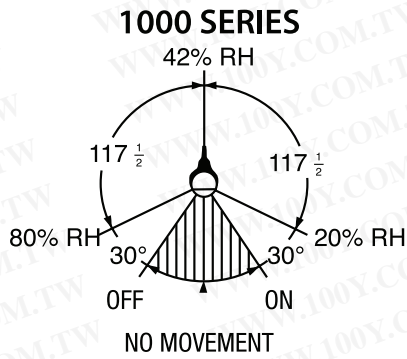
- Tough plastic casing with built-in switch
- Improved woven nylon sensing element guaranteeing speed of response 12 times faster than film type nylon elements.
- Greater stability of set points, even with significant changes in relative humidity
- Optimized differential equivalent to 5% RH.
- Switch grade plastic casing eliminates the need for earth connection
- Option of 4% RH and 15% RH differentials.
- Choice between SPST switches (2) and SPDT switches (2) to suit different applications
- Option of fixed or variable set points
- Available with gold plated contacts for microprocessor applications
- Versions with fixed settings available
- Available with box and cover for wall mounting (800 series)
- Option of electronic controller (contact Ranco Marketing)
- Available with built-in or remote sensor

Technical Specifications

Humidity range	from 10 to 60% RH from 20 to 80% RH from 30 to 90% RH
Fixed differentials	4% RH or 15% RH
Switch	SPDT or SPST / Terminals 6.3 x 0.8 mm
Function of terminals (when present)	1 Closes when RH increases 2 Common 3 Closes when RH decreases
Switch/casing insulation material:	Thermoplastic, self-extinguishing flame class 94V-0 Comparative tracking index 600
Control cycle rating	Automatic switch cycles at 60 °C 50000 / Manual dial shaft cycles 6000
Ambient temperature conditions:	Switch head 0 °C to 60 °C / Shipping -30 °C to 65.5 °C
Casing enclosure rating	IP00
Electric shock protection	Class 1
Fixing method	With screws, or option of snap-fit specified by user



Dial configuration



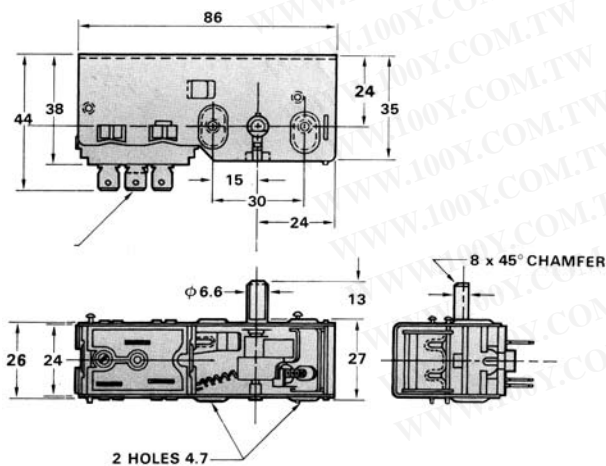
J10 WITHOUT ENCLOSURE

Part number	Application	Setting range	Switch	N° terminals	ELECTRICAL RATING		
					Inductive FLA	Inductive LRA	Resistive NIA
J10 - 1000	Dehumidification	20% - 80%	SPST	1 - 2	12.0/3.7 A	50/22.2 A	12.0/3.7 A
J10 - 2000	Humidification	20% - 60%	SPST	2 - 3	12.0/3.7 A	50/22.2 A	12.0/3.7 A
J10 - 7000	Dehumidification and humidification	20% - 80%	SPDT	2 - 1	12.0/3.7 A	50/22.2 A	12.0/3.7 A
J10 - 7300		20% - 80%	SPDT	2 - 3	2.0/1.0 A	12.0/6.0 A	2.0/1.0 A

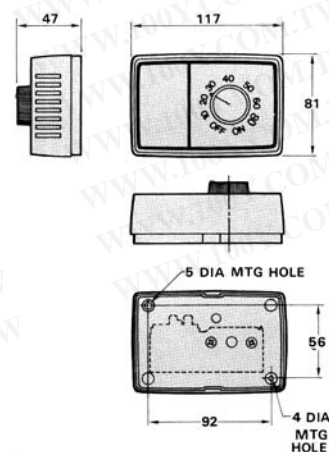
J10 WITH ENCLOSURE

Part number	Application	Setting range	Switch	ELECTRICAL RATING		
				Inductive FLA	Inductive LRA	Resistive NIA
J10 - 809	Dehumidification	20% - 80%	SPST	12.0/3.7 A	50/22.2 A	12.0/3.7 A
J10 - 810	Dehumidification	20% - 80%	SPST	12.0/3.7 A	50/22.2 A	12.0/3.7 A
J10 - 811	Humidification	20% - 80%	SPDT	12.0/3.7 A	50/22.2 A	12.0/3.7 A
J10 - 821	Humidification	20% - 80%	SPST	2.0/1.0 A	12.0/6.0 A	2.0/1.0 A

J10 - Dimensions



J10 - Wall mounting





Applications

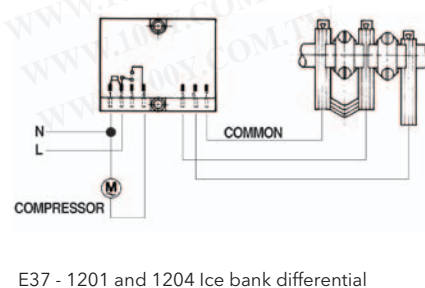
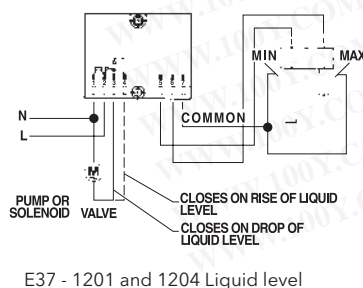
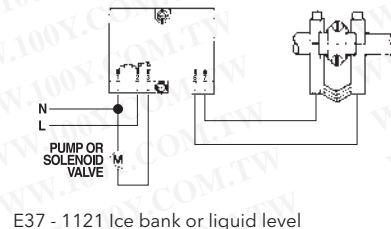
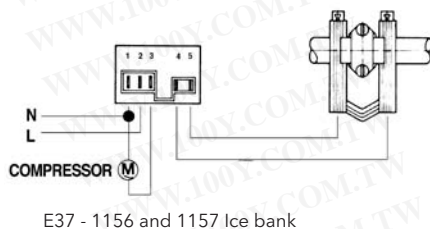
E37 controls measure the electrical conductivity between a set of electrodes and change the status of the output switch accordingly. They are available in different versions with two or three sensor electrodes and SPDT or SPST relay output contacts. Stainless steel electrodes are used, and there is also the option of specially designed L56 sensors, compatible with E37 controls. The electrodes can be used to measure the thickness of ice or to control the level of liquids.

Common features

- Power consumption: less than 3V A
- Ambient operating temperature: 0 °C to 60 °C
- Storage temperature: -25 °C to 85 °C
- Input/output isolation: 2.5kV
- Terminal sizes: input 6.3 mm / sensor 4.8 mm
- Available with built-in or remote sensor

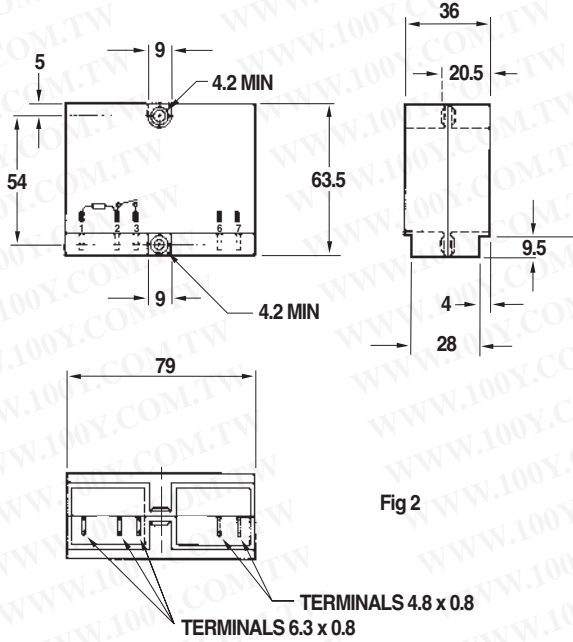
Part number	Application	Power supply	Configuration		Relay current		Resistance (K ohm)			Delay (sec.)		Certifications
			Sensors	Relay	Ind.	Res.	Relay cut-in	Relay cut-on	Diff.	Relay cut-in	Relay cut-on	
E37M1121001	ice bank	220V- 50 Hz	2	SPST	5A	10A	47	85	38			VDE
E37M1156001	ice bank	220/240V- 50 Hz	2	SPST	4A (20A max)	4A	47	85	38	2	25	
E37M1157001	ice bank	115V- 60 Hz	2	SPST	4A (20A max)	4A	47	85	38	2	25	CSA, UL
E37M1201001	Liquid level or ice thickness	220/240V- 50 Hz	3	SPDT	4A (20A max)	10A	47	85	72	\	\	
E37M1204001	Liquid level or ice thickness	120V- 60 Hz	3	SPDT	4A	10A	45	85	72	\	\	CSA, UL

E37 - Wiring diagrams

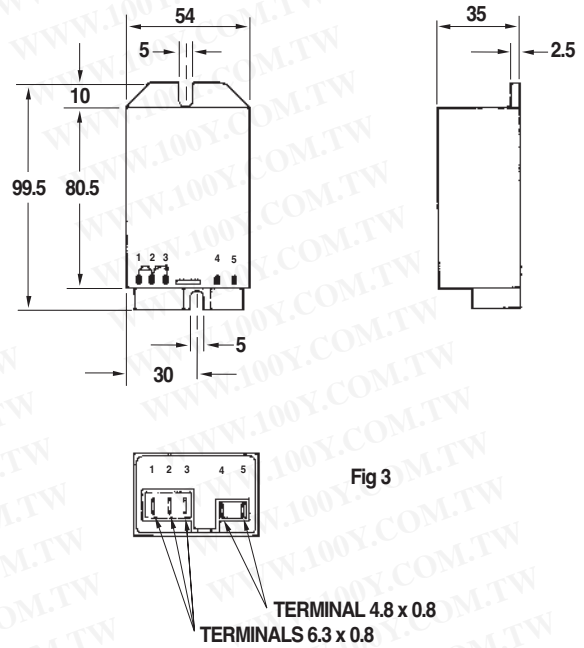




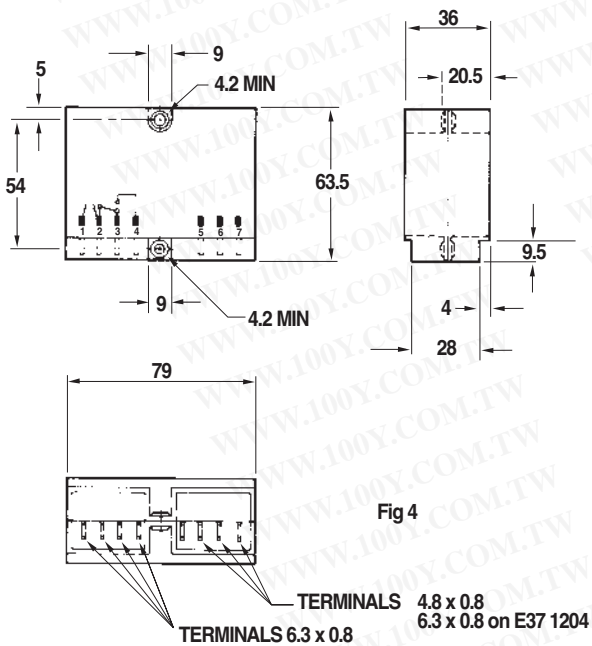
E37 - Dimensions



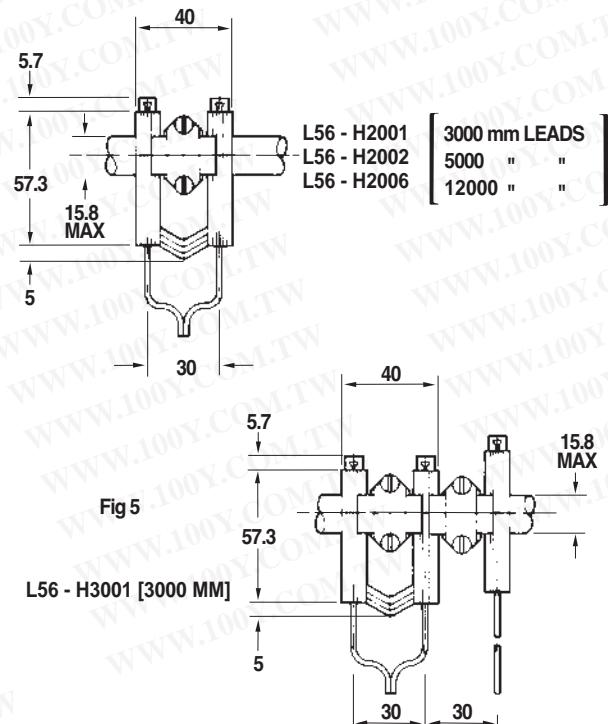
E37- 1121



E37- 1156 and 1157



E37- 1201 and 1204



L56 Sensor Assemblies

O16-O52 Temperature controls



Applications

- O16 and O52 controls are commercial refrigeration and room thermostats equipped with a single pole SPDT switch, which opens and closes in response to a rise or fall in temperature.

Common features

The electrical rating of the SPDT single pole switch for all O16 controls is:

- 16 (16) A 250V - normally open or normally closed
- 1 (1) A 250V - opposite side.
- Storage temperature: -30 °C to +55 °C

Terminals: 1 common; 2 opens the contact when the temperature increases; 4 closes the contact when the temperature increases.

Cable entry: O16 Insulating grommet, 14 mm; O52 PG 16 connector

Installation: Two threaded holes in the back of the casing to accept M4x6mm screws (supplied)

Adjustment: by means of hex nut incorporating recess for crosshead screwdriver, on both range and differential spindles. An adjustable knob is also available, supplied as standard with certain models.

CASING ENCLOSURE RATING

- STANDARD IP44 (O16): enclosed as in dimensions drawing on page 15
- OPTION OF IP66 (O52): enclosed as in dimensions drawing on page 15

Ambient air thermostats

Part number	Measurement range (°C)	Differential (°C)		Tube dimensions (mm)
		Upper limit	Lower limit	
O16-H6900	from (-40)-35 to -7	1.0 fixed	1.5 fixed	diam. 49 max x 43 max
O16-H6901	from (-22)-18 to +13	1.0 fixed	1.5 fixed	diam. 49 max x 43 max
O16-H6902	from (-10)-5 to +25	1.0 fixed	1.5 fixed	diam. 49 max x 43 max
O16-H6903	from (+5)+10 to +40	1.0 fixed	1.5 fixed	diam. 49 max x 43 max
O16-H6904	from (-40)-35 to -7	from 1.0 to 6.0	from 3.0 to 12.0	diam. 49 max x 43 max
O16-H6905	from (-22)-18 to +13	from 1.0 to 6.0	from 3.0 to 12.0	diam. 49 max x 43 max
O16-H6906	from (-10)-5 to +25	from 1.0 to 6.0	from 3.0 to 12.0	diam. 49 max x 43 max
O16-H6907	from (+5)+10 to +40	from 1.0 to 6.0	from 3.0 to 12.0	diam. 49 max x 43 max



Thermostats with bulb or coiled sensing element

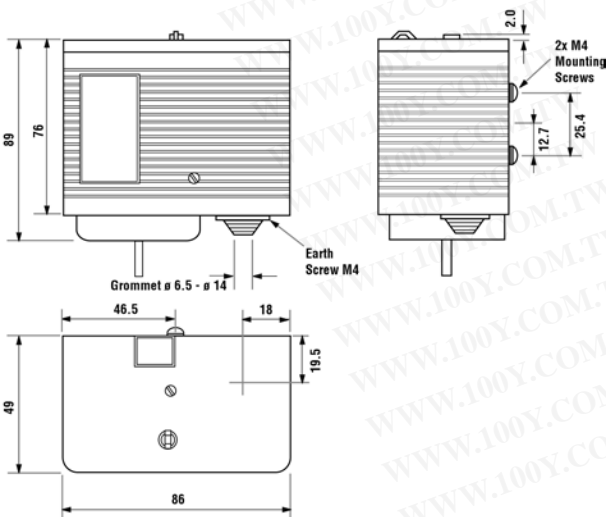
Part number	Measurement range (°C)	Differential (°C)		Length of capillary including bulb (mm)	Tube dimensions (mm)	Thermostat type
		Upper limit	Lower limit			
O16-H6980	from (-22)-18 to +13	from 1.7 to 7.0	from 3.0 to 12.0	2000	diam. 14.5 x 140	Cross ambient
O16-H6981	from (-10)-5 to +25	from 1.7 to 7.0	from 3.0 to 12.0	2000	diam. 14.5 x 140	Cross ambient
O16-H6982	from (-2)-1 to +10	1.0 fixed	1.0 fixed	1830	diam. 14.5 x 140	Cross ambient
O16-H6983	from (+5)+10 to +40	from 1.7 to 8.0	from 3.0 to 12.0	1830	diam. 14.5 x 140	Cross ambient
O16-H6930	from (-40)-34 to +32	from 3.0 to 22.0	from 3.0 to 22.0	2000	diam. 9.5 x 150	Cross ambient
O16-H6932	from (+30)+35 to +115	from 2.0 to 14.0	from 2.0 to 14.0	2000	diam. 9.5 x 150	Cross ambient
O16-H6989	from (-10)-5 to +29	from 1.7 to 7.0	from 3.0 to 12.0	2000	diam. 14.5 x 140	Cross ambient with stop switch
O16-H6931	from (-40)-34 to +32	from 3.0 to 22.0	from 3.0 to 12.0	2000	diam. 9.5 x 150	Cross ambient with stop switch
O16-H6921	from (-40)-35 to - 7	from 1.7 to 7.0	from 3.0 to 12.0	2000	\	Straight capillary
O16-H6922	from (-22)-18 to +13	from 1.7 to 7.0	from 3.0 to 12.0	2000	\	Straight capillary
O16-H6924	from (-10)-5 to +25	from 1.7 to 7.0	from 3.0 to 12.0	2000	\	Straight capillary
O16-H6950	from (-40)-35 to - 7	from 1.7 to 7.0	from 3.0 to 12.0	2000	diam. 9.3 x 38	Coiled capillary
O16-H6951	from (-22)-18 to +13	from 1.7 to 7.0	from 3.0 to 12.0	2000	diam. 9.3 x 38	Coiled capillary
O16-H6954	from (-10)-5 to +25	from 1.7 to 7.0	from 3.0 to 12.0	2000	diam. 9.3 x 38	Coiled capillary
O16-H6959	from (-22)-18 to +13	from 1.7 to 7.0	from 3.0 to 12.0	2000	diam. 9.3 x 38	Coiled capillary with stop switch

Lower operating limit: Values in brackets preceding the measurement range indicate minimum lower operating limit values. Accordingly, the range / differential combination must never fall below these values.

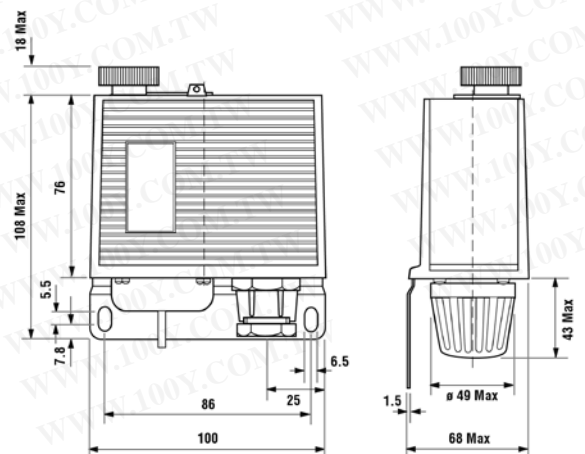
Differential: The differential does not remain constant across the full measurement range. This is due to the physical properties of the bellows charge gas.

Special versions are available.

O16 - Dimensions



O52 - Dimensions

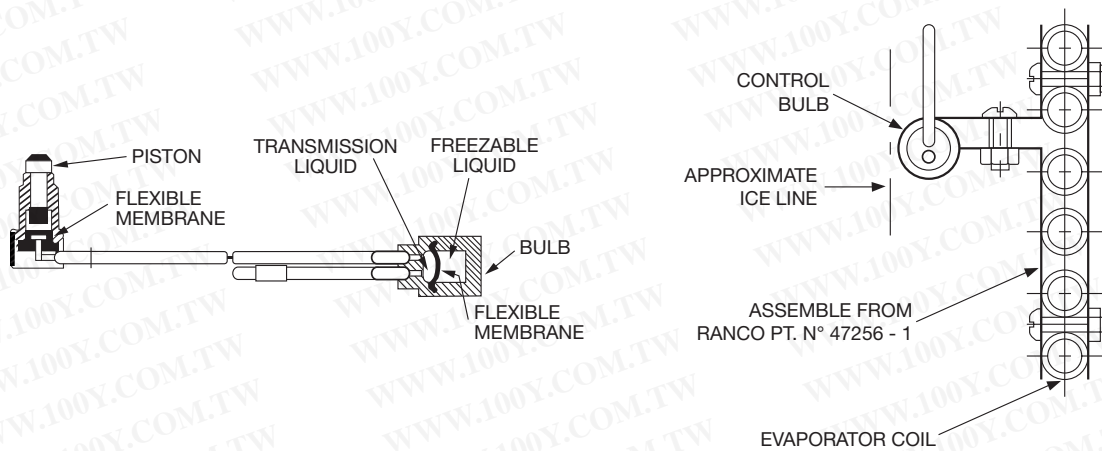




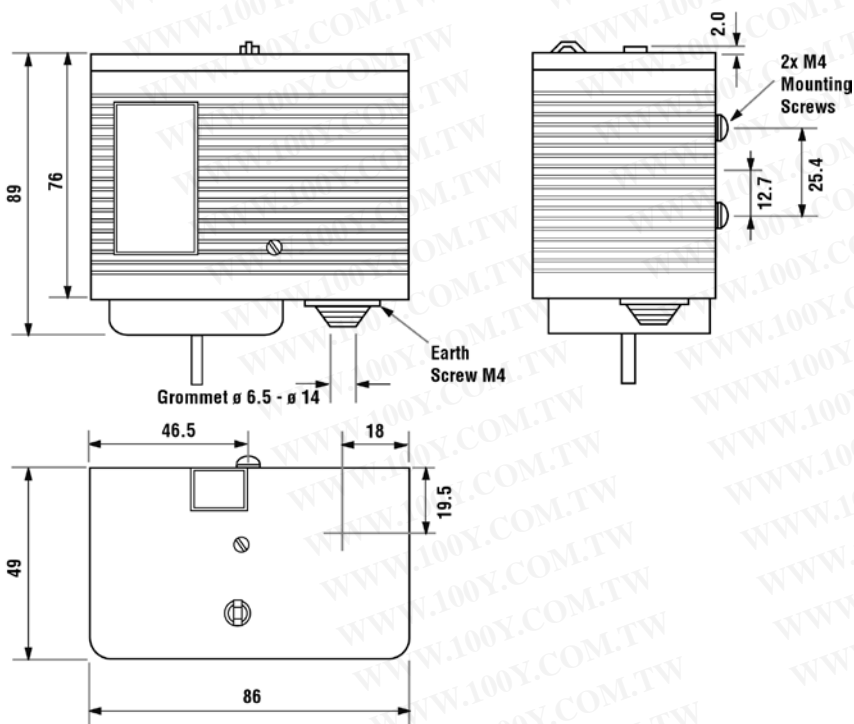
Applications

The O16H6999 control is used to determine the thickness of the ice in ice bank chillers.

Size and positioning of sensing element



O16 - Dimensions





Applications

- O16 and O52 instruments are single mechanical pressure switches for high and low pressure, equipped with a single pole switch (SPDT) that closes and opens as the pressure increases or decreases.

Common features

The electrical rating of the SPDT single pole switch for all O16 controls is:

- 16 (16) A 250Va - normally open or normally closed
- 1 (1) A 250V - opposite side.
- Storage temperature: -30 °C to +55 °C

Connection to pressure line: 7/16 - 20 UNF straight male output connector, 1/4 flared female connector

Cable entry: O16 Insulating grommet, 14 mm; O52 PG 16 connector

Refrigerant: Equipment suitable for use with the more common gases

Installation: Two threaded holes in the back of the casing to accept M4x6mm screws (supplied)

Terminals: 1 common, 2 opens when the pressure increases, 4 closes when the pressure increases.

- CASING ENCLOSURE RATING:
- STANDARD IP44 (O16): enclosed as in O16 dimensions drawing
 - OPTION OF IP66 (O52): enclosed as in O52 dimensions drawing

Operating and safety pressures

Bellows type	Maximum stationary pressure (bar)	Burst Pressure (bar)
Low Pressure	20	80
High Pressure	35	128
TÜV	35	80 (safety)

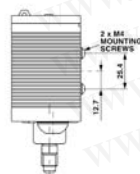
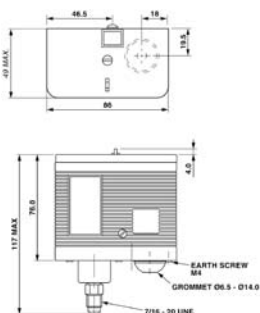
Models and Features

Part number	High or Low	Reset	Measurement range PSI (bar)	Differential PSI (bar)	Bellows type	Connection
O16-H6703	low	automatic	10"...100 (-0.3...7)	9...58 (0.6...4)	standard	7/16" - 20 UNF male
O16-H6704	low	automatic	10"...100 (-0.3...7)	9...58 (0.6...4)	standard	braze welded tube diam. 6 mm L.100 mm
O16-H6713	low	automatic	10"...100 (-0.3...7)	9...58 (0.6...4)	standard	1000 mm capillary with 1/4" SAE nut
O16-H6705	low	manual	100...435 (-7...30)	9 (0.6)	standard	7/16" - 20 UNF male
O16-H6750	high	automatic	100...435 (-7...30)	35...115 (2...8)	standard	7/16" - 20 UNF male
O16-H6763	high	automatic	100...435 (-7...30)	35...115 (2...8)	TUV	braze welded tube diam. 6 mm L.100 mm
O16-H6751	high	manual	100...435 (-7...30)	45 (3.2)	standard	7/16" - 20 UNF male
O16-H6758	high	automatic	100...435 (-7...30)	42...115 (3...8)	TUV	7/16" - 20 UNF male
O16-H6759	high	manual*	100...435 (-7...30)	45 (3.2)	TUV	7/16" - 20 UNF male
O16-H6764	high	manual	100...435 (-7...30)	45 (3.2)	TUV	braze welded tube diam. 6 mm L.100 mm
O16-H6760	high	manual**	100...435 (-7...30)	45 (3.2)	TUV	7/16" - 20 UNF male
O16-H6765	high	manual	100...435 (-7...30)	45 (3.2)	TUV	braze welded tube diam. 6 mm L.100 mm

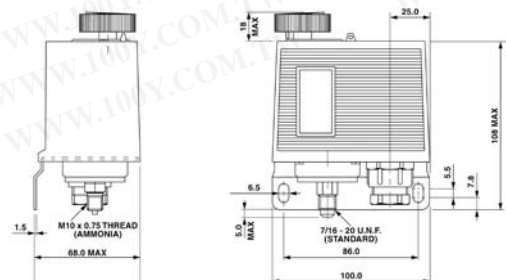
* reset without removing cover

** reset with removal of cover

O16 - Dimensions



O52 - Dimensions



O17 Double pressure controls



Applications

- O17 instruments are double mechanical pressure switches for high or low pressure, equipped with a single pole switch (SPDT) that opens and closes in response to a rise or fall in pressure.

Common features

Electrical rating of single pole SPDT switch (except in the case of the dual signal version)	<ul style="list-style-type: none"> • 16 (16) A 250V - normally open or normally closed • 1 (1) A 250V - opposite side.
Ambient temperature	-30 °C to +55 °C
Connection to pressure line	7/16 - 20 UNF straight male output connector, 1/4 flared female connector
Cable entry	14mm insulating grommet
Refrigerants	Equipment suitable for use with the more common gases.
Installation	Two threaded holes in the back of the casing to accept M4x6mm screws (supplied)
Standard O17 terminals	1 common, 2 opens when low pressure increases and opens when high pressure increases.
O17 dual signal terminals	1 common, 2 closes signal circuit when low pressure decreases, 3 closes signal circuit when high pressure increases, 4 closes when low pressure increases and opens when high pressure increases.
O17 version with dual signal	terminals 1 and 4 as above, terminals (1 and 2) and (1 and 3): 0.1A 250V

Operating and safety pressures

Bellows type	Maximum stationary pressure (bar)	Burst Pressure (bar)
Low Pressure	20	80
High Pressure	35	128
TÜV	35	80 (safety)

Models and Features

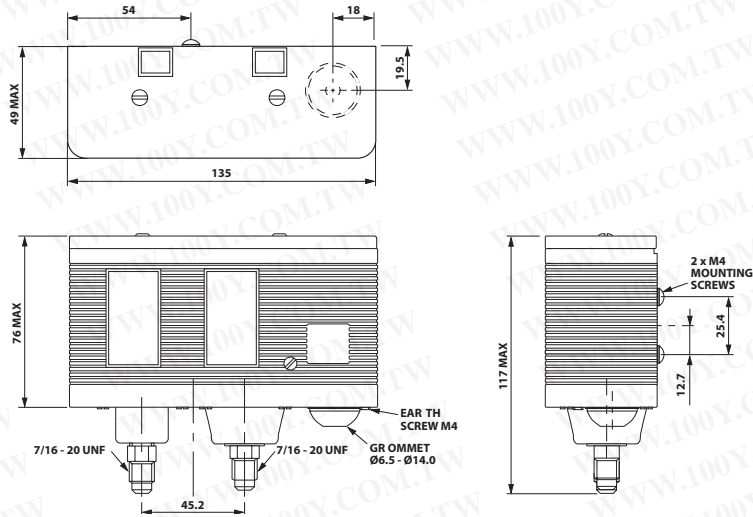
Part number	Reset		Measurement range PSI (bar)		Differential PSI (bar)		Bellows type	Connection	Switch
	High	Low	High	Low	High	Low			
O17-H4701	automatic	automatic	100...435 (7...30)	10"...100 (-0.3...7)	50 (3.5)	9...58 (0.6...4)	standard	7/16"-20 UNF male	dual signal
O17-H4702	automatic	automatic	100...435 (7...30)	10"...100 (-0.3...7)	50 (3.5)	9...58 (0.6...4)	standard	braze welded tube Ø 6 mm - L 100 mm	dual signal
O17-H6701	automatic	automatic	100...435 (7...30)	10"...100 (-0.3...7)	50 (3.5)	9...58 (0.6...4)	standard	7/16"-20 UNF male	
O17-H4703	manual	manual	100...435 (7...30)	10"...100 (-0.3...7)	50 (3.5)	9 (0.6)	standard	7/16"-20 UNF male	dual signal
O17-H4704	manual	manual	100...435 (7...30)	10"...100 (-0.3...7)	50 (3.5)	9 (0.6)	standard	braze welded tube Ø 6 mm - L 100 mm	dual signal
O17-H4713	manual	manual	100...435 (7...30)	10"...100 (-0.3...7)	50 (3.5)	9 (0.6)	standard	1000 mm capillary with 1/4" SAE nut	dual signal
O17-H4705	manual	automatic	100...435 (7...30)	10"...100 (-0.3...7)	50 (3.5)	9...58 (0.6...4)	standard	7/16"-20 UNF male	dual signal
O17-H4706	manual	automatic	100...435 (7...30)	10"...100 (-0.3...7)	50 (3.5)	9...58 (0.6...4)	standard	braze welded tube Ø 6 mm - L 100 mm	dual signal
O17-H4715	manual	automatic	100...435 (7...30)	10"...100 (-0.3...7)	50 (3.5)	9...58 (0.6...4)	standard	1000 mm capillary with 1/4" SAE nut	dual signal
O17-H6705	manual	automatic	100...435 (7...30)	10"...100 (-0.3...7)	50 (3.5)	9...58 (0.6...4)	standard	7/16"-20 UNF male	
O17-H4758	automatic	automatic	100...435 (7...30)	10"...100 (-0.3...7)	58 (4)	9...58 (0.6...4)	TUV	7/16"-20 UNF male	dual signal
O17-H4763	automatic	automatic	100...435 (7...30)	10"...100 (-0.3...7)	58 (4)	9...58 (0.6...4)	TUV	braze welded tube Ø 6 mm - L 100 mm	dual signal
O17-H4759	manual*	automatic	100...435 (7...30)	10"...100 (-0.3...7)	58 (4)	9...58 (0.6...4)	TUV	7/16"-20 UNF male	dual signal
O17-H4760	manual**	automatic	100...435 (7...30)	10"...100 (-0.3...7)	58 (4)	9...58 (0.6...4)	TUV	7/16"-20 UNF male	dual signal
O17-H4764	manual	automatic	100...435 (7...30)	10"...100 (-0.3...7)	58 (4)	9...58 (0.6...4)	TUV	braze welded tube Ø 6 mm - L 100 mm	dual signal
O17-H6759	manual	automatic	100...435 (7...30)	10"...100 (-0.3...7)	58 (4)	9...58 (0.6...4)	TUV	7/16"-20 UNF male	
O17-H6764	manual	automatic	100...435 (7...30)	10"...100 (-0.3...7)	58 (4)	9...58 (0.6...4)	TUV	7/16"-20 UNF male	
O17-H6703	manual	manual	100...435 (7...30)	10"...100 (-0.3...7)	50 (3.5)	9 (0.6)	standard	7/16"-20 UNF male	

* reset without removing cover

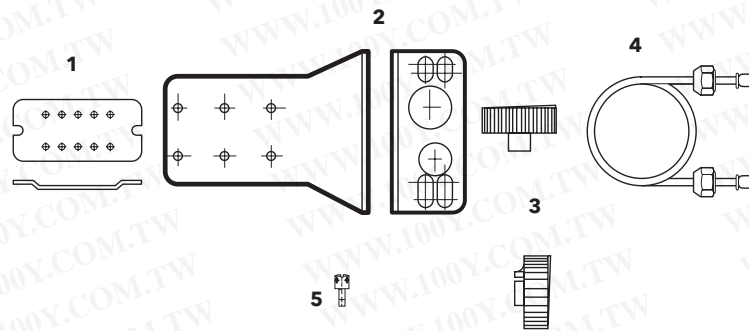
** reset with removal of cover



O17 - Dimensions

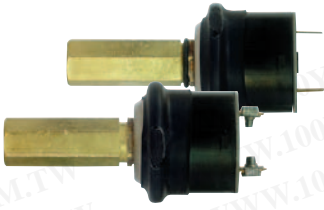


Accessories for O series controls



Part number	Description
48129-3 (1)	Flat mounting bracket
31696-1 (2)	Angle mounting bracket
3200115-1 (3)	Knob
6309138-1 (2301742-1) (4)	1000 mm capillary with 7/16" fittings, without valve opener
6309138-2 (2301742-2) (4)	1500 mm capillary with 7/16" fittings, without valve opener
450199-1 (5)	Screw with clearance hole

G60 - G63 Fixed setting pressure switches



Applications

The G60/63 range of pressure switches are designed to protect refrigeration systems against critical conditions by setting high and low pressure limits. The G60 low pressure switch protects the compressor against low suction pressures where there is a danger of liquid refrigerant entering the compressor and causing damage. The G63 high pressure switch protects the system against excessive delivery pressures, which can be dangerous and cause expensive damage to equipment.

Technical Specifications

Differential	setting fitting, see graphs
Refrigerants	Compatible with all non corrosive refrigerants and gases
Ambient temperature - switch head	-30 °C to +55 °C
Maximum compressor head temperature	135 °C
Storage and transport temperature limits	-30 °C to +70 °C
Switch	S.P.D.T. or S.P.S.T.
Electrical rating	a) 6 (6)A 250V; b) 10FLA (40LRA) at 120V ~ when used as S.P.S.T. on both contacts; c) 10FLA (40LRA) at 120V load ~ 1 (1)A on opposite contact when used as S.P.D.T.; d) 5A at 14V dc (inductive)
Switch markings	Terminal 1 Common. Terminal 2 Break on pressure rise Terminal 4 Break on pressure drop
Enclosure rating	IP00 - IP44 - IP66

G60 LOW PRESSURE

- Operating range: fixed within limits of - 10"Hg vacuum (-0.35 bar) to 100 psi (7 bar) cut out; 160 psi (11 bar) cut in
- Reset mode: automatic reset. Manual reset for cut-out on pressure drop only

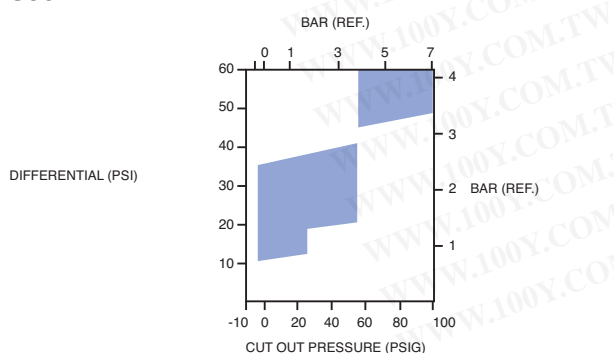
Pressure range	Tolerance	Differential	Tolerance	TÜV
V~ - 75 psi	± 2 psi	7 - 15 psi	± 3 psi	
V~ - 75 psi	± 2 psi	20 - 35 psi	± 4 psi	
50 - 100 psi	± 4 psi	40 - 55 psi	± 7 psi	

G63 HIGH PRESSURE

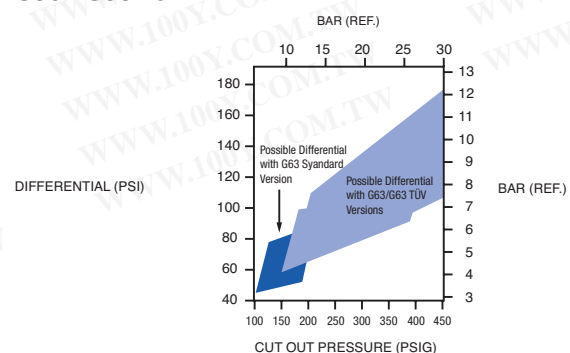
- Operating range: fixed within limits of - 450 PSI (31 bar) to 100 psi (7 bar) cut out; 75 psi (5.2 bar) cut in
- Reset mode: automatic reset. Manual reset for cut-out on pressure rise only

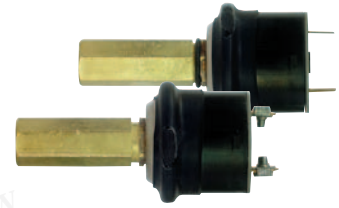
Pressure range	Tolerance	Differential	Tolerance	TÜV
100 - 180 psi	± 4 psi	50 - 70 psi	± 7 psi	Yes
150 - 250 psi	± 4 psi	70 - 110 psi	± 10 psi	Yes
250 - 350 psi	± 6 psi	100 - 140 psi	± 14 psi	Yes
340 - 450 psi	± 10 psi	120 - 180 psi	± 14 psi	Yes
400 - 450 psi	± 10 psi	150 - 200 psi	± 16 psi	Yes

G60



G60 - G63 TÜV





Features and options

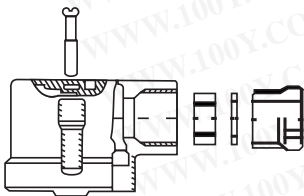
Type	Diaphragme thickness (mm)	Maximum stationary pressure PSI (bar)	Burst Pressure PSI (bar)
G60	0.076	290 PSI (20 bar)	1015 PSI (70 bar)
G60	0.1 / 0.15	510 PSI (35 bar)	2030 PSI (140 bar)
G63	0,15	510 PSI (35 bar)	2030 PSI (140 bar)
TÜV (safety)	0.076	/	675 PSI (47 bar)

Accessories kits

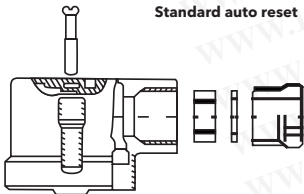
Part Number	Type	Notes
3301270-1	Auto reset	Without guide plate
3301270-2	Auto reset	Without guide plate
3301270-5	Manual reset	Without guide plate
3301270-6	Manual reset	Without guide plate

G60 - G63 - Dimensions

Manual or auto reset with Guide Plate

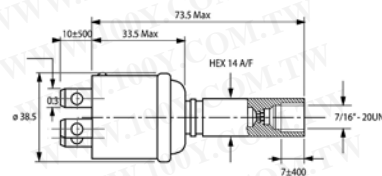


Standard auto reset

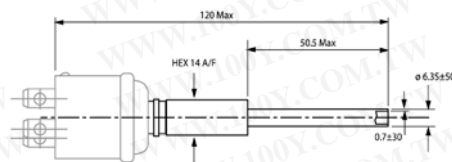


G60 - G63 - Pressure connections

TYPE A



TYPE D



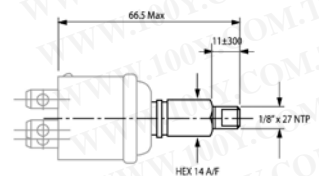
PRESSURE CONNECTIONS

TYPE A: 7/16" - 20 UNF female

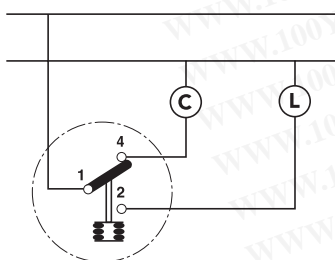
TYPE D: 1/4" x 150 mm brazed fitting with seal

TYPE E: 1/8" x 27NPT Male

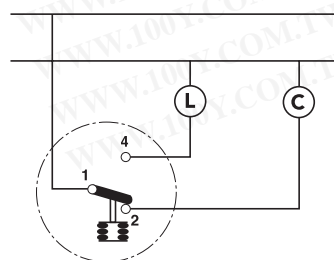
TYPE E



G60 - G63 - Wiring diagrams



Cycle interruption in the event of low pressure



Cycle interruption in the event of high pressure



Applications

The SnapDisk Pressure switches are designed to protect refrigeration systems against critical conditions by setting high and low pressure limits.

The low pressure switch protects the compressor against low suction pressures where there is a danger of liquid refrigerant entering the compressor and causing damage.

The high pressure switch protects the system against excessive delivery pressures, which can be dangerous and cause expensive damage to equipment.

Technical data

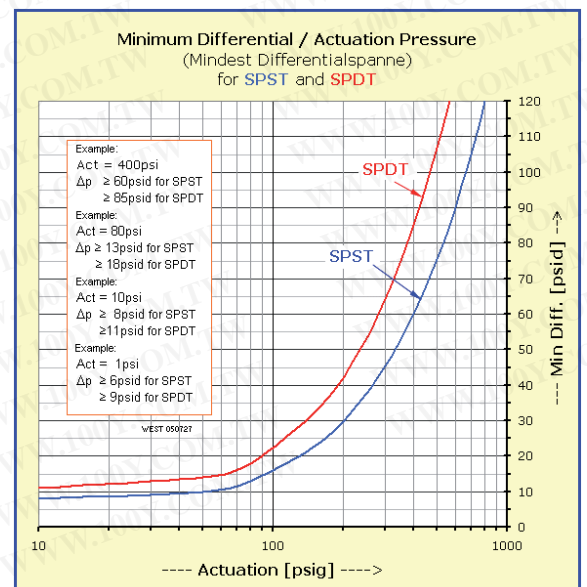
Pressure fittings	1/4" SAE female with valve opener 1/8" NPT male 1/4" NPT male 1/4" Tube 3/32" Capillary tube
Electrical connections	1/4" (6.35 mm) Faston connectors 3/16" (4.8 mm) Faston connectors Wires (stripped ends or terminals) - different lengths
Pressure range	Adjustments: 0...44.8 bar
Service life	HR: 100,000 cycles HL: 6,000 cycles HC: 250,000 cycles (contact sales department)
Operating temperature range	- 40 ... + 135°C
Switch logic at standard atmospheric pressure - 0 bar	Normally Open (NO): - closes when pressure increases Normally Closed (NC) - opens when pressure increases SPDT - open/close on pressure increase/decrease FLA: Nominal current LRA: Starting current

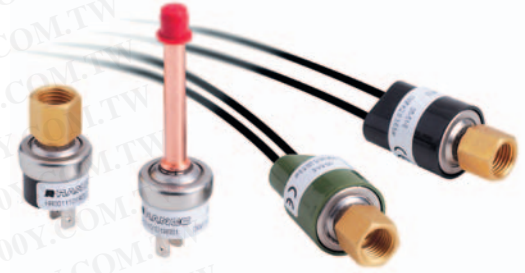
Electrical specifications - HR and HL series

5-28 Vdc	Volts (a.c.)	FLA	FRA
3A	24	-	-
	120	6	40.2
	240/277	4	26.4

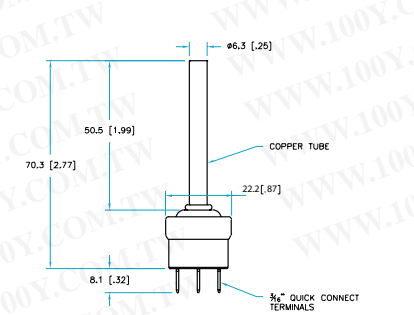
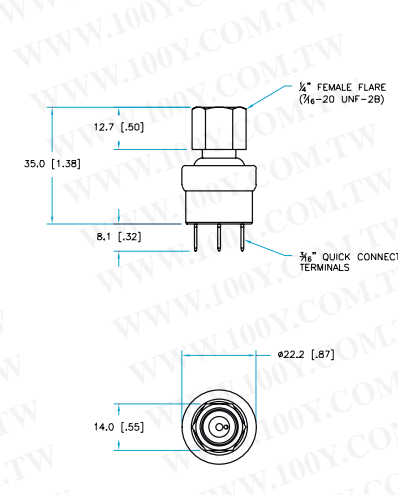
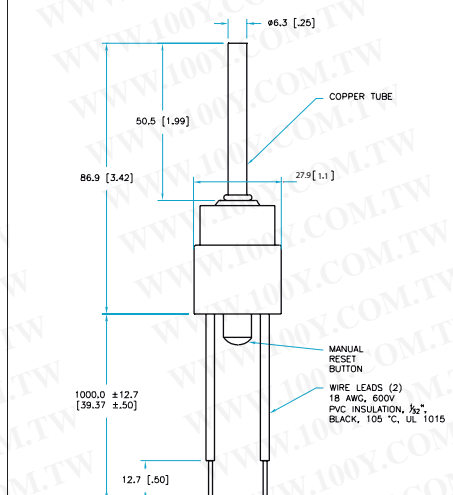
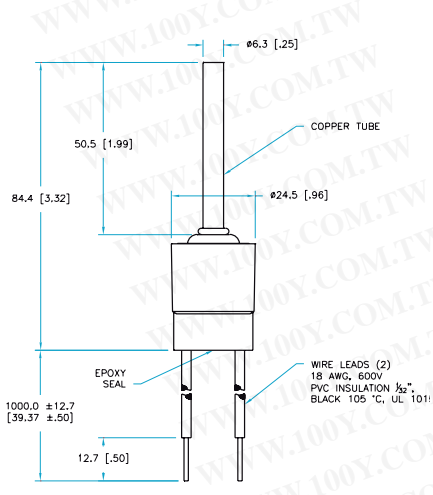
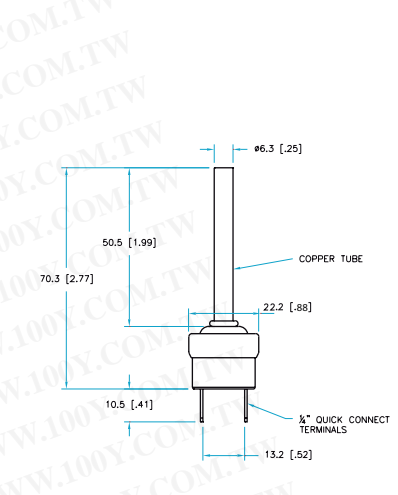
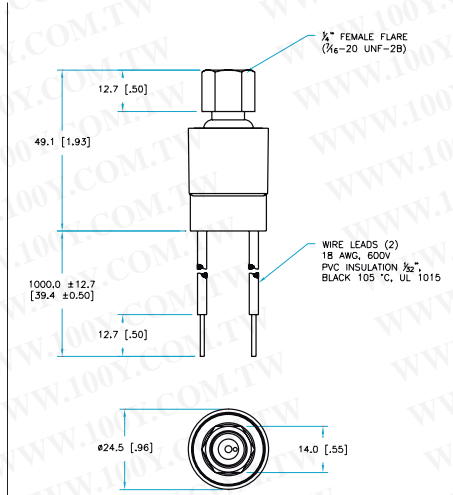
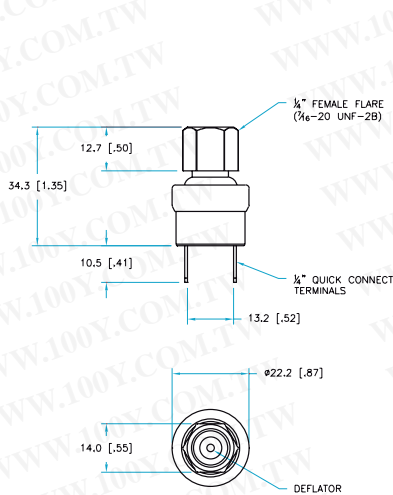
Electrical specifications - HC series

5-28 Vdc	Volts (a.c.)	FLA	FRA
15A	24	-	-
	120	13	65
	240/277	10	45
	480	4	24
	600	3.2	20





Dimensions:



P30 - Differential pressure switches for Oil



Applications

The P30 oil differential pressure switch is designed for use with compressors in refrigeration systems that use external oil pumps with refrigerants. It protects the compressor against loss of lubricating oil pressure, which could otherwise cause serious bearing damage resulting ultimately in breakdown of the compressor.

Connected to the crankcase and oil pump by capillaries, the P30 pressure switch detects the difference between pressure in the crankcase and pressure on the outlet side of the oil pump.

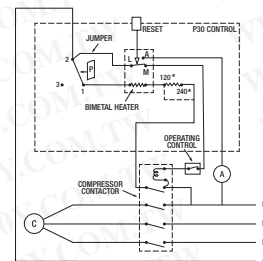
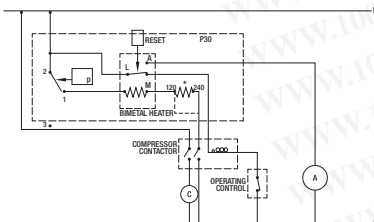
Model	Delay	Pressure - bar (psig)			Fitting	
		C.O.P.D. range	C.O.P.D. factory setting	C.I.P.D. minus C.O.P.D.	Capillary+flare nut (+/-50mm)	male flare
P30 3601	60 +/-15	0,7-4 (10-60) adj.	0,7 (10)	0.5 (7) max	914mm	
P30 3701	90 +/-20	0,7-4 (10-60) adj.	0,7 (10)	0.5 (7) max	914mm	
P30 3702	90 +/-20	0,7-4 (10-60) adj.	0,7 (10)	0.5 (7) max		1¼ SAE
P30 3801	120 +/-20	0,7-4 (10-60) adj.	0,7 (10)	0.5 (7) max	914mm	
P30 5826	120 +/-20	0.6 (9) fixed	0.6 (9) fixed	0.5 (7) max	914mm	
P30 5827	120 +/-20	0.6 (9) fixed	0.6 (9) fixed	0.5 (7) max		1¼ SAE
P30 5839	120 +/-20	0.6 (9) fixed	0.6 (9) fixed	0.5 (7) max		1¼ SAE
P30 5842	120 +/-20	0.6 (9) fixed	0.6 (9) fixed	0.5 (7) max	914mm	
P30 5848	120 +/-20	0.6 (9) fixed	0.6 (9) fixed	0.5 (7) max		1¼ SAE

Terminology

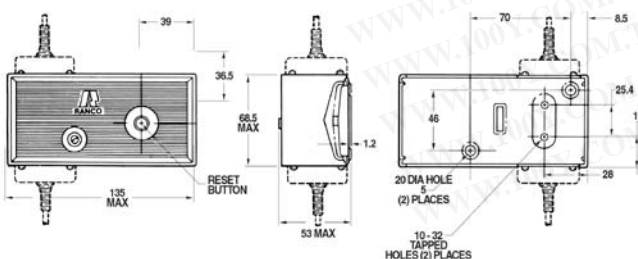
The main function of the differential pressure switch is to detect the difference between pressure in the crankcase and pressure on the outlet side of the oil pump. When this value is below the preset value – known as the cut-out pressure differential (C.O.P.D.) – the compressor will shut off automatically.

- Oil pump pressure (O.P.P.): the pressure generated by the oil pump
- Case pressure (C.P.): pressure internally of the compressor
- Effective oil pressure (E.O.P.): Cut-out differential
- Cut-out pressure differential (C.O.P.D.): difference in pressure between O.P.P. and C.P. . at this value, the time delay relay is activated to shut off the system
- Cut-in pressure differential (C.I.P.D.): difference in pressure between O.P.P. and C.P.: at this value, the time delay relay is deactivated, allowing the system to restart
- Pressure difference (P.D.): C.I.P.D. minus C.O.P.D.

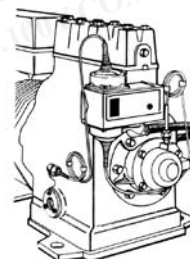
P30 - Wiring diagrams - Applications



P30 - Dimensions



P30 - Installation





Applications

The RK30 control unit monitors the level of oil in the compressor by way of an optoelectronic sensor so as to prevent operation without lubricant and effectively prolong the service life of the compressor. The unit incorporates a solenoid valve for automatic replenishment of the oil, and an alarm relay output (factory-set to generate an alarm or stop the compressor by means of an external power relay).

Technical data

Supply voltage	24 V~ ±10% 50/60Hz
Operating current	30VA for each RK30 (when using the standard coil)
Electrical connection	9.4mm Industry Standard connectors
Connector	EN 175301-803A
Relay output	NO and NC free contact
Contact data	output up to 230V~ @2A. The NO alarm contact (blue wire) is closed when the RK30 is powered up.
Materials used in manufacture	nickel-plated steel
Enclosure rating	IP 65
Storage temperature	-40 °C / +60 °C
Oil temperature	-40 °C / +85 °C
Ambient operating temperature	-40 °C / +60 °C
Maximum operating pressure	45 bar (up to 60 bar on request)
MOPD	45 bar (up to 60 bar on request)
Oil injector fitting	7/16 - 20 UNEF male
Cable type	PVC - CEI 20-22
Cable operating temperature	-20 ... +70°C (in fixed position)

Electrical connections

Electronic sensor connections (Industry Std 9.4 mm), viewed from above. The arrow indicates the side on which the oil level sight glass is located; the loose end of 90° connector emerges on the side opposite.

A - Power supply - (cable with 2 wires and valve branch)

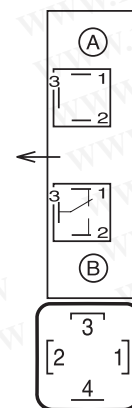
- 2: Brown (24V~)
- 3: Blue (24V~)

B - Alarm relay - (3 core cable)

- 1: Brown (closed in alarm state)
- 2: Blue (open in alarm state)
- 3: Black: (common)

Solenoid valve connections EN 175301-803 (EX DIN 43650 size A).

The coil is connected between pins 1 and 2, and in the wiring harness supplied, it is suitably connected to connector A of the optoelectronic sensor.





Application and part numbers

Application	Part Number	Description
FREON	RK30000000500	optical oil regulator Lx @ 45bar 24V~ no adapter stand alone
	RK30100000500	optical oil regulator Rx @ 45bar 24V~ no adapter stand alone
	RK30010000500	optical oil regulator Lx @ 45bar 24V~ 1 1/8" UNEF stand alone
	RK30110000500	optical oil regulator Rx @ 45bar 24V~ 1 1/8" UNEF stand alone
	RK30020000500	optical oil regulator Lx @ 45bar 24V~ 3/4" NPT stand alone
	RK30120000500	optical oil regulator Rx @ 45bar 24V~ 3/4" NPT stand alone
	RK30030000500	optical oil regulator Lx @ 45bar 24V~ 3/4/6-hole flange stand alone
	RK30130000500	optical oil regulator Rx @ 45bar 24V~ 3/4/6-hole flange stand alone
CO₂	RK30033000500	optical oil regulator Lx @ 60bar 24V~ 3/4/6-hole flange stand alone
	RK30133000500	optical oil regulator Rx @ 60bar 24V~ 3/4/6-hole flange stand alone

Application	Kit part numbers	Part numbers included	Description
FREON	RK300401005K0	RK30000000500	optical oil regulator Lx @ 45bar 24V~ no adapter stand alone
		RK30CA0300000	power supply \ valve cable assembly 3 m
		RK30CB0300000	alarm cable 3 m
		RK30A00300000	FLANGE ADAPTER 3/4/6 HOLES
		RK30A00100000	ADAPTER 1-1/8" 18 UNEF
		RK30A00200000	ADAPTER 3/4" NPT
FREON	RK301401005K0	RK30100000500	optical oil regulator Rx @ 45bar 24V~ no adapter stand alone
		RK30CA0300000	power supply \ valve cable assembly 3 m
		RK30CB0300000	alarm cable 3 m
		RK30A00300000	FLANGE ADAPTER 3/4/6 HOLES
		RK30A00100000	ADAPTER 1-1/8" 18 UNEF
		RK30A00200000	ADAPTER 3/4" NPT

Accessories

Part number	Description
RK30CA0300000	Power cable 3 m
RK30CB0300000	Alarm cable 3 m
RK30CA0600000	Power cable 6 m
RK30CB0600000	Alarm cable 6 m
RK30A00100000	adapter 1-1/8" 18 UNEF
RK30A00200000	adapter 3/4" NPT
RK30A00300000	adapter 3/4/6 holes
TF111205	Transformer 24/230V 35Va protected



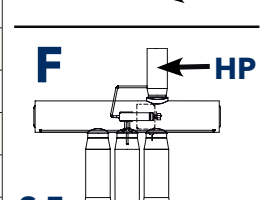
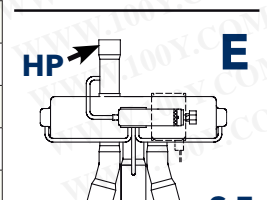
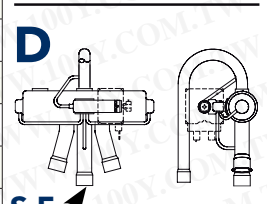
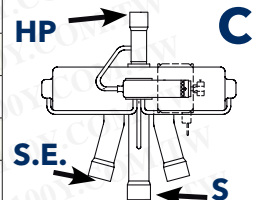
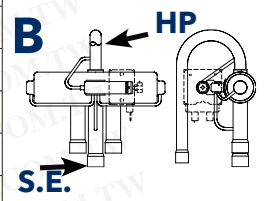
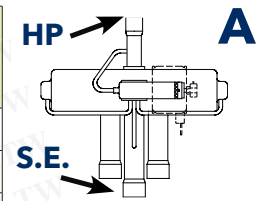
Applications

The 4-way reversing valve is the key component in systems able to provide heating and cooling in a climate controlled space by reversing the flow direction of the refrigerant. It is used for room air conditioning, central air conditioning systems and packaged units. Reversing valves are designed for heat pump systems with capacities from 3 kW up to 580 kW. They are suitable for the majority of refrigerants, such as R407C - R410A - R134A. The design of the valve also guarantees minimum pressure drop and very low risk of leakage. The available models offer numerous different types of connections, configurations and capacities for specific applications.

Standard models are available in small quantities per box for greater flexibility of purchasing and use.

V series - Part numbers and technical data

Part Number	R407C kW min/max (US ton min/ max)	R410A kW min/max (US ton min/ max)	R134A kW min/max (US ton min/ max)	Tube sizes (C.T.S.)				Style	Weight (g) (without coil)	Standard packaging	Coil
				Suction (S.E.C.)		Delivery					
				mm	inches	mm	inches				
V0-406050100	1.34 / 3.02 (0.38 / 0.86)	1.55 / 3.83 (0.44 / 1.09)	1.16 / 2.36 (0.33 / 0.67)	9.64	3/8	8.12	5/16	B	210	36	LDL/LDK
V1-408050100	1.41 / 4.57 (0.40 / 1.30)	1.76 / 5.98 (0.50 / 1.70)	1.41 / 3.87 (0.40 / 1.10)	12.84	1/2	8.01	5/16	A	285	36	LDL/LDK
V1-408060100	1.41 / 4.57 (0.40 / 1.30)	1.76 / 5.98 (0.50 / 1.70)	1.41 / 3.87 (0.40 / 1.10)	12.84	1/2	9.67	3/8	A	285	36	LDL/LDK
V1-406060100	1.41 / 4.57 (0.40 / 1.30)	1.76 / 5.98 (0.50 / 1.70)	1.41 / 3.87 (0.40 / 1.10)	9.64	3/8	9.67	3/8	A	285	36	LDL/LDK
V1-406050100	1.41 / 4.57 (0.40 / 1.30)	1.76 / 5.98 (0.50 / 1.70)	1.41 / 3.87 (0.40 / 1.10)	9.64	3/8	8.01	5/16	A	285	36	LDL/LDK
V1-406050200	1.41 / 4.57 (0.4 / 1.3)	1.76 / 5.98 (0.50 / 1.70)	1.41 / 3.87 (0.4 / 1.1)	9.64	3/8	8.12	5/16	B	310	36	LDL/LDK
V1-406060200	1.41 / 4.57 (0.4 / 1.3)	1.76 / 5.98 (0.50 / 1.70)	1.41 / 3.87 (0.4 / 1.1)	9.64	3/8	9.67	3/8	B	310	36	LDL/LDK
V2-408060100	2.81 / 6.33 (0.8 / 1.8)	3.17 / 7.74 (0.90 / 2.20)	2.46 / 4.92 (0.7 / 1.4)	12.84	1/2	9.67	3/8	A	285	36	LDL/LDK
V2-408060200	2.81 / 6.33 (0.8 / 1.8)	3.17 / 7.74 (0.90 / 2.20)	2.46 / 4.92 (0.7 / 1.4)	12.84	1/2	9.67	3/8	B	310	36	LDL/LDK
V2-410060300	3.87 / 7.03 (1.1 / 2.0)	4.57 / 8.79 (1.30 / 2.50)	3.17 / 5.63 (0.9 / 1.6)	16.03	5/8	9.67	3/8	c	315	36	LDL/LDK
V2-410060400	3.87 / 7.03 (1.1 / 2.0)	4.57 / 8.79 (1.30 / 2.50)	3.17 / 5.63 (0.9 / 1.6)	16.03	5/8	9.67	3/8	D	335	36	LDL/LDK
V3-410080700	3.87 / 9.50 (1.1 / 2.7)	4.57 / 11.96 (1.30 / 3.40)	3.17 / 7.39 (0.9 / 2.1)	16.03	5/8	12.84	1/2	E	310	36	LDL/LDK
V3-4100H0700	3.87 / 9.50 (1.1 / 2.7)	4.57 / 11.96 (1.30 / 3.40)	3.17 / 7.39 (0.9 / 2.1)	16.03	5/8	12.70 O.D.	1/2 O.D.	E	310	36	LDL/LDK
V3-412080800	3.87 / 9.85 (1.1 / 2.8)	4.57 / 12.31 (1.30 / 3.50)	3.17 / 7.74 (0.9 / 2.2)	19.18	3/4	12.84	1/2	E	350	36	LDL/LDK
V6-414120100	3.87 / 18.99 (1.1 / 5.4)	4.57 / 23.92 (1.30 / 6.80)	3.17 / 14.77 (0.9 / 4.2)	22.36	7/8	19.18	3/4	A	810	18	LDL/LDK
V6-414100100	3.87 / 18.99 (1.1 / 5.4)	4.57 / 23.92 (1.30 / 6.80)	3.17 / 14.77 (0.9 / 4.2)	22.36	7/8	16.03	5/8	A	810	18	LDL/LDK
V6-414080100	3.87 / 18.99 (1.1 / 5.4)	4.57 / 23.92 (1.30 / 6.80)	3.17 / 14.77 (0.9 / 4.2)	22.36	7/8	12.83	1/2	A	810	18	LDL/LDK
V6-412080100	3.87 / 18.99 (1.1 / 5.4)	4.57 / 23.92 (1.30 / 6.80)	3.17 / 14.77 (0.9 / 4.2)	19.18	3/4	12.83	1/2	A	745	18	LDL/LDK
V10-414080100	11.25 / 33.06 (3.2 / 9.4)	13.01 / 41.85 (3.70 / 11.90)	9.85 / 26.03 (2.8 / 7.4)	22.35	7/8	12.83	1/2	A	1'200	12	LDL/LDK
V10-414120100	11.25 / 33.06 (3.2 / 9.4)	13.01 / 41.85 (3.70 / 11.90)	9.85 / 26.03 (2.8 / 7.4)	22.35	7/8	19.18	3/4	A	1'200	12	LDL/LDK
V10-414140400	11.25 / 33.06 (3.2 / 9.4)	13.01 / 41.85 (3.70 / 11.90)	9.85 / 26.03 (2.8 / 7.4)	22.35	7/8	22.36	7/8	A	1'220	12	LDL/LDK
V10-418140100	11.25 / 37.63 (3.2 / 10.7)	13.01 / 47.48 (3.70 / 13.50)	9.85 / 29.54 (2.8 / 8.4)	28.78	1 1/8	22.36	7/8	A	1'310	12	LDL/LDK
V10-418120100	11.25 / 37.63 (3.2 / 10.7)	13.01 / 47.48 (3.70 / 13.50)	9.85 / 29.54 (2.8 / 8.4)	28.78	1 1/8	19.18	3/4	A	1'310	12	LDL/LDK
V10-414100100	11.25 / 33.06 (3.2 / 9.4)	13.01 / 41.85 (3.70 / 11.90)	9.85 / 26.03 (2.8 / 7.4)	22.35	7/8	16.03	5/8	A	1'200	12	LDL/LDK
V10-414120200	17.23 / 33.06 (4.9 / 9.4)	19.73 / 41.85 (5.61 / 11.90)	14.42 / 26.03 (4.1 / 7.4)	22.35	7/8	19.18	3/4	A	1'190	12	LDL/LDK
V10-4180M0200	17.23 / 37.63 (4.9 / 10.7)	19.73 / 47.48 (5.61 / 13.50)	14.42 / 29.54 (4.1 / 8.4)	28.78	1 1/8	19.05 O.D.	3/4 O.D.	A	1'300	12	LDL/LDK
V10-418100200	17.23 / 37.63 (4.9 / 10.7)	19.73 / 47.48 (5.61 / 13.50)	14.42 / 29.54 (4.1 / 8.4)	28.78	1 1/8	16.03	5/8	A	1'300	12	LDL/LDK
V10-418120200	17.23 / 37.63 (4.9 / 10.7)	19.73 / 47.48 (5.61 / 13.50)	14.42 / 29.54 (4.1 / 8.4)	28.78	1 1/8	19.18	3/4	A	1'300	12	LDL/LDK
V10-418140200	17.23 / 37.63 (4.9 / 10.7)	19.73 / 47.48 (5.61 / 13.50)	14.42 / 29.54 (4.1 / 8.4)	28.78	1 1/8	22.36	7/8	A	1'300	12	LDL/LDK
V12-4220T0200	22.86 / 46.78 (6.5 / 13.3)	26.38 / 58.91 (7.50 / 16.75)	18.99 / 36.93 (5.4 / 10.5)	35.13	1 3/8	28.58 O.D.	1 1/8 O.D.	F	2'030	6	LDL/LDK



LEGEND - HP: High Pressure; S: Suction; S.E.: Connected to high pressure when solenoid is energized

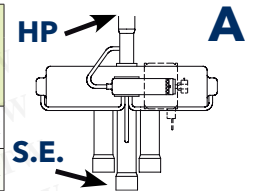


Applications

The 4-way reversing valve is the key component in systems able to provide heating and cooling in a climate controlled space by reversing the flow direction of the refrigerant. It is used for room air conditioning, central air conditioning systems and packaged units. Reversing valves are designed for heat pump systems with capacities from 3 kW up to 580 kW. They are suitable for the majority of refrigerants, such as R407C - R410A - R134A. The design of the valve also guarantees minimum pressure drop and very low risk of leakage. The available models offer numerous different types of connections, configurations and capacities for specific applications. Standard models are available in small quantities per box for greater flexibility of purchasing and use.

N series - Part numbers and technical data

Part Number	R407C kW min/max (US ton min/ max)	R410A kW min/max (US ton min/ max)	R134A kW min/max (US ton min/ max)	Tube sizes (C.T.S.)				Style	Weight (g) (without coil)	Standard packaging	Coil
				Suction (S.E.C.)		Delivery					
				mm	inches	mm	inches				
N15C00S *	15.83 / 54.51 (4.50 / 15.50)	15.83 / 61.55 (4.50 / 17.50)	12.31 / 40.80 (3.50 / 11.60)	28.80	1 1/8	22.40	7/8A	A	1'260		LDL/LDK
N20C00G *	17.59 / 72.45 (5.00 / 20.60)	17.60 / 81.60 (5.00 / 23.20)	13.72 / 54.16 (3.90 / 15.40)	32.00	1 1/4	25.60	1A	A	3'100	1	LDL/LDK
N20C10G	17.59 / 72.45 (5.00 / 20.60)	17.60 / 81.60 (5.00 / 23.20)	13.72 / 54.16 (3.90 / 15.40)	32.00	1 1/4	25.60	1A	A	3'200	1	LDL/LDK
N20C01G *	17.59 / 72.45 (5.00 / 20.60)	17.60 / 81.60 (5.00 / 23.20)	13.72 / 54.16 (3.90 / 15.40)	34.90	1 3/8	28.60	1 1/8A	A	3'100	1	LDL/LDK
N20C11G	17.59 / 72.45 (5.00 / 20.60)	17.60 / 81.60 (5.00 / 23.20)	13.72 / 54.16 (3.90 / 15.40)	34.90	1 3/8	28.60	1 1/8A	A	3'200	1	LDL/LDK
N30C00G *	26.38 / 108.68 (7.50 / 30.90)	26.40 / 122.40 (7.51 / 34.80)	20.40 / 81.24 (5.80 / 23.10)	38.30	1 1/2	32.00	1 1/4A	A	3'200	1	LDL/LDK
N30C10G	26.38 / 108.68 (7.50 / 30.90)	26.40 / 122.40 (7.51 / 34.80)	20.40 / 81.24 (5.80 / 23.10)	38.30	1 1/2	32.00	1 1/4A	A	3'300	1	LDL/LDK
N40C10G	35.17 / 144.90 (10.00 / 41.20)	35.20 / 163.20 (10.01 / 46.40)	27.08 / 108.32 (7.70 / 30.80)	45.00	1 7/9	38.10	1 1/2A	A	7'500	1	LDL/LDK
N50C10G	35.17 / 181.13 (10.00 / 51.50)	35.20 / 204.00 (10.01 / 58.00)	27.08 / 135.40 (7.70 / 38.50)	54.20	2 1/7	38.10	1 1/2A	A	7'600	1	LDL/LDK
N60C10G	52.80 / 194.80 (15.10 / 55.60)	52.80 / 245.00 (15.10 / 70.00)	34.80 / 154.35 (10.00 / 44.10)	67.00	2 5/8	41.50	1 1/2A	A	8'900	1	LDL/LDK



NOTE: capacities indicated are based on the following conditions:

evaporation temperature: 7.2 °C;

sub cooling: 5.0 °C;

condensation temperature: 54.4 °C;

superheat: 5.0 °C;

pressure drop: 0.014 MPa

* Without mounting brackets

V-N Reversing valve operating specifications

Min pressure Δ to reverse 0.15 MPa

Max pressure Δ to reverse 3.04 MPa

Max operating pressure 4.68 MPa (V series) / 4.17 MPa (N series)

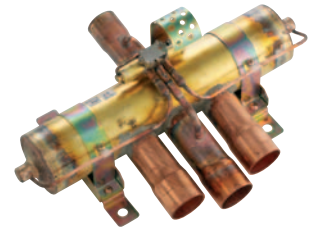
Min burst pressure 17.23 MPa (V series) / 16.7 MPa (N series)

Max operating temperature 121 °C

Min operating voltage 85% of rated voltage

Max operating voltage 110% of rated voltage

LEGEND - HP: High Pressure; S: Suction; S.E.: Connected to high pressure when solenoid is energized

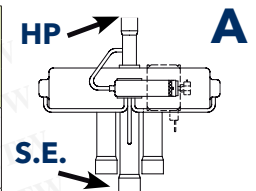


Applications

The 4-way reversing valve is the key component in systems able to provide heating and cooling in a climate controlled space by reversing the flow direction of the refrigerant. It is used for air conditioning in rooms, central air conditioning systems and packaged units. Reversing valves are designed for heat pump systems with capacities from 3 kW up to 580 kW. They are suitable for the majority of refrigerants, such as R407C - R410A - R134A. The design of the valve also guarantees minimum pressure drop and very low risk of leakage. The available models offer numerous different types of connections, configurations and capacities for specific applications. Standard models are available in small quantities per box for greater flexibility of purchasing and use.

VH series - Part numbers and technical data

Part Number	R407C kW min/max (US ton min/max)	R410A kW min/max (US ton min/max)	R134A kW min/max (US ton min/max)	Tube sizes (C.T.S.)				Weight (g) (without coil)	Standard packaging	Coil
				Suction (S.E.C.)		Delivery				
				mm	inches	mm	inches			
VH32085	70.34 / 289.80 (20.00 / 82.40)	54.16 / 216.65 (15.40 / 61.60)	54.16 / 216.65 (15.40 / 61.60)	Flange RBK 65A	Flange RBK 65A	Flange RBK 50A	Flange RBK 50A	55'000	1	LDL/LDK
VH32123	105.51 / 436.11 (30.00 / 124.00)	81.24 / 324.97 (23.10 / 92.40)	81.24 / 324.97 (23.10 / 92.40)	Flange RBK 65A	Flange RBK 65A	Flange RBK 50A	Flange RBK 50A	73'000	1	LDL/LDK
VH32163	140.68 / 579.60 (40.00 / 164.80)	108.32 / 432.59 (30.80 / 123.00)	108.32 / 433.29 (30.80 / 123.20)	Flange RBK 65A	Flange RBK 65A	Flange RBK 50A	Flange RBK 50A	82'000	1	LDL/LDK



NOTE: capacities indicated are based on the following conditions:
 evaporation temperature: 7.2 °C;
 sub cooling: 5.0 °C;
 condensation temperature: 54.4 °C;
 superheat: 5.0 °C;
 pressure drop: 0.014 MPa

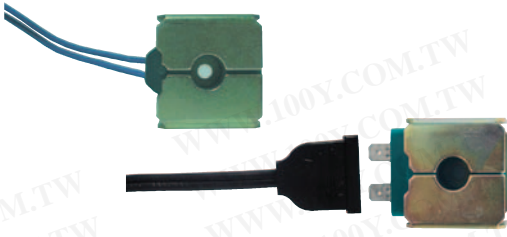
VH Reversing valve operating specifications

Min pressure Δ to reverse 0.34 MPa
 Max pressure Δ to reverse 2.25 MPa
 Max operating pressure 3.3 MPa
 Min burst pressure 16.5 MPa

Max operating temperature 120 °C
 Min operating voltage 85% of rated voltage
 Max operating voltage 110% of rated voltage

LEGEND - HP: High Pressure; S: Suction; S.E.: Connected to high pressure when solenoid is energized

LDK - LDL Coils



Applications

RANCO LDL and LDK solenoid coils are now compatible with the entire range of RANCO reversing valves. LDL and LDK magnetic coils are epoxy encapsulated, resistant to moisture and use minimal energy. Coils are colour coded for easy identification of the different input voltages available.

LDK coils - Part numbers and technical specifications

Coil	Colour	Power supply	Frequency	Power 50/60Hz	UL classification	Cable length	
						mm	inches
LDK-11	Red	24V~	50/60Hz	5/4	A	1200	48
LDK-31	Black	120V~	50/60Hz	5/4	A	1200	48
LDK-41	Green	208 / 240V~	50/60Hz	5/4	A	1200	48
LDK-73	Yellow	12V=	-	10	F	1200	48
LDK-83	Orange	24V=	-	10	F	1200	48

The LDK coil includes a W29 wiring harness with 1200 mm leads
Other cable lengths available on request

LDL coils - Part numbers and technical specifications

Coil	Colour	Power supply	Frequency	Power 50/60Hz	UL classification	Cable length	
						mm	inches
LDL-11	Red	24V~	50/60Hz	5/4	A	1200	48
LDL-41	Green	208 / 240V~	50/60Hz	5/4	A	1200	48
LDL-41	Green	208 / 240V~	50/60Hz	5/4	A	2000	80

Other cable lengths available on request



Applications

The PXV solenoid operated expansion valve controls the flow of refrigerant to the evaporator by modulating the opening time of the valve element, allowing a wide range of power variation. Highly precise and reliable control of refrigerant flow increases the efficiency of the entire system. There are 9 interchangeable orifices available, with power ratings from 1 kW to 24 kW. This valve must be piloted by a V800 electronic driver. The typical application is in refrigeration systems, especially refrigerated counter displays of the kind used in supermarkets.

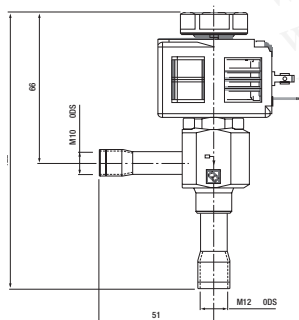
PVX - Technical data

Voltage tolerance (Vac)	+6/-10%
IEC Enclosure rating	IP65; IP68
Operating principle	Pulse Width Modulation
Adjustment range (capacity range)	6 seconds
Minimum operating time	1 second
Capacity (R404A)	15 kW
Adjustment range (capacity range)	10...100%
Braze welded connections	3/8" - 1 / 2", 10 mm - 12 mm, 1 / 2" - 5/8", 12 mm - 16 mm
TS temperature	-40 - 100 °C
Ambient temperature	-40 - 50 °C
Leakage from valve seat	<1cc/min
	<0.003 of kv value
Minimum open pressure differential (minOPD)	0 bar
Maximum open pressure differential (MOPD)	18 bar
Maximum operating pressure	45 bar
Burst Pressure	330/250 bar
Certifications	97/23/EC
PED	Category II art.3.3

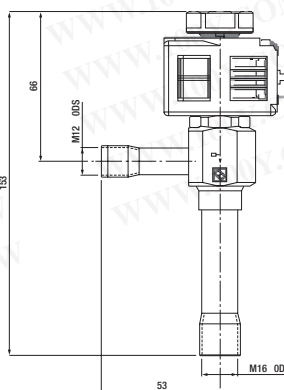
General coil specifications

Coil type	Eliwell part number	Voltage (V~)	Voltage tolerance (%)	Frequency (Hz)	Power (W)	Power consumption		Insulation class	Maximum temperature		Electrical connections	Enclosure rating
						Start	Operation		Windings (°C)	Ambient (°C)		
						(50Hz)	(50Hz)					
PXV	PXVB0ARA20000	24	+10 / -10	50/60	8	1490	700	F	110	50	connector DIN 43650 part number PXVB0AR020000	standard IP65 (for IP68 contact the sales department)
PXV	PXVB0ARA60000	220/230	+6 / -10	50/60	8	162	76	F	110	50		
PXV CO ₂	PXVE0ARA60000	220 / 230	+6 / -10	50/60	22	190	110	F	110	50		

Orifices 1 to 6



Orifices 7 to 9



PXV Pulse expansion valve



General specifications and capacities of valves (common refrigerants)

Part Number	Orifice type	Orifice hole (mm)	ODS connections				Flow factor Kv (m ³ /h)	Capacity (kW)				
			(in)		(mm)			Refrigerant				
			IN	OUT	IN	OUT		R22	R134a	R404A - R507	R407C	R410A
PXVB03S010000	1	0.5	3/8"	1/2"	-	-	0.010	1.0	0.9	0.8	1.1	1.3
PXVBM10S01000			-	-	10	12						
PXVB03S020000	2	0.7	3/8"	1/2"	-	-	0.017	1.9	1.7	1.6	2.0	2.4
PXVBM10S02000			-	-	10	12						
PXVB03S030000	3	0.8	3/8"	1/2"	-	-	0.023	2.5	2.0	1.9	2.4	3.0
PXVBM10S03000			-	-	10	12						
PXVB03S040000	4	1.1	3/8"	1/2"	-	-	0.043	3.9	3.2	2.9	3.8	4.8
PXVBM10S04000			-	-	10	12						
PXVB03S050000	5	1.3	3/8"	1/2"	-	-	0.065	6.7	5.6	5.1	6.7	8.4
PXVBM10S05000			-	-	10	12						
PXVB03S060000	6	1.7	3/8"	1/2"	-	-	0.113	9.2	7.7	7.0	9.1	11.4
PXVBM10S06000			-	-	10	12						
PXVB04S070000	7	2.3	1/2"	5/8"	-	-	0.200	14.7	12.2	11.3	15.3	18.2
PXVBM12S07000			-	-	12	16						
PXVB04S080000	8	2.5	1/2"	5/8"	-	-	0.230	17.4	14.7	13.5	17.7	21.6
PXVBM12S08000			-	-	12	16						
PXVB04S090000	9	2.7	1/2"	5/8"	-	-	0.250	19.3	16.3	15.0	19.6	24.1
PXVBM12S09000			-	-	12	16						

Rated capacities are referred to:

- Evaporation temperature $T_{evap} = +5^{\circ}\text{C}$
- Condensation temperature $T_{cond} = +32^{\circ}\text{C}$
- Liquid temperature at valve inlet $T_{liq} = +28^{\circ}\text{C}$



General specifications and capacities of CO₂ valves (R744)

Part Number	Orifice type	Orifice hole (mm)	ODS connections				Flow factor Kv (m ³ /h)	Capacity (kW)	
			(in)		(mm)			Refrigerant	
			IN	OUT	IN	OUT		R744	
PXVE03S010000	1	0.5	3/8"	1/2"	-	-	0.010	2.32	
PXVEM10S01000			-	-	10	12			
PXVE03S020000	2	0.7	3/8"	1/2"	-	-	0.017	4.38	
PXVEM10S02000			-	-	10	12			
PXVE03S030000	3	0.8	3/8"	1/2"	-	-	0.023	5.65	
PXVEM10S03000			-	-	10	12			
PXVE03S040000	4	1.1	3/8"	1/2"	-	-	0.043	8.92	
PXVEM10S04000			-	-	10	12			
PXVE03S050000	5	1.3	3/8"	1/2"	-	-	0.065	15.72	
PXVEM10S05000			-	-	10	12			
PXVE03S060000	6	1.7	3/8"	1/2"	-	-	0.113	21.57	
PXVEM10S06000			-	-	10	12			
PXVE03S070000	7	2.3	1/2"	5/8"	-	-	0.200	35.75	
PXVEM10S07000			-	-	12	16			

General specifications and capacities of R290 valves

Part Number	Orifice type	Orifice hole (mm)	ODS connections				Flow factor Kv (m ³ /h)	Capacity (kW)	
			(in)		(mm)			Refrigerant	
			IN	OUT	IN	OUT		R290	
PXVV03S010000	1	0.5	3/8"	1/2"	-	-	0.010	0.7	
PXVVM10S01000			-	-	10	12			
PXVV03S020000	2	0.7	3/8"	1/2"	-	-	0.017	1.4	
PXVVM10S02000			-	-	10	12			
PXVV03S030000	3	0.8	3/8"	1/2"	-	-	0.023	1.9	
PXVVM10S03000			-	-	10	12			
PXVV03S040000	4	1.1	3/8"	1/2"	-	-	0.043	2.9	
PXVVM10S04000			-	-	10	12			
PXVV03S050000	5	1.3	3/8"	1/2"	-	-	0.065	5.0	
PXVVM10S05000			-	-	10	12			
PXVV03S060000	6	1.7	3/8"	1/2"	-	-	0.113	7.9	
PXVVM10S06000			-	-	10	12			
PXVV04S070000	7	2.3	1/2"	5/8"	-	-	0.200	14.3	
PXVVM12S07000			-	-	12	16			
PXVV04S080000	8	2.5	1/2"	5/8"	-	-	0.230	16.4	
PXVVM12S08000			-	-	12	16			
PXVV04S090000	9	2.7	1/2"	5/8"	-	-	0.250	17.9	
PXVVM12S09000			-	-	12	16			

Rated capacities are referred to:

- Evaporation temperature T_{evap} = +5°C
- Condensation temperature T_{cond} = +32°C
- Liquid temperature at valve inlet T_{liq} = +28°C

PXV Pulse expansion valve



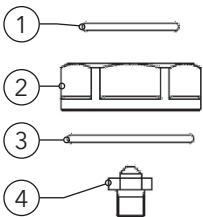
PXV valves orifice kits

Part Number	Description	Refrigerants
PXVB0AR630000	N° 1 orifice kit	R22, R134a, R404A, R407C, R410A, R507
PXVB0AR640000	N° 2 orifice kit	
PXVB0AR650000	N° 3 orifice kit	
PXVB0AR660000	N° 4 orifice kit	
PXVB0AR670000	N° 5 orifice kit	
PXVB0AR680000	N° 6 orifice kit	
PXVB0AR690000	N° 7 orifice kit	
PXVB0AR780000	N° 8 orifice kit	
PXVB0AR790000	N° 9 orifice kit	
PXVE0AR630000	N° 1 orifice kit - CO ₂	R744
PXVE0AR640000	N° 2 orifice kit - CO ₂	
PXVE0AR650000	N° 3 orifice kit - CO ₂	
PXVE0AR660000	N° 4 orifice kit - CO ₂	
PXVE0AR670000	N° 5 orifice kit - CO ₂	
PXVE0AR680000	N° 6 orifice kit - CO ₂	
PXVE0AR690000	N° 7 orifice kit - CO ₂	
PXVV0AR630000	N° 1 orifice kit - R290	R290
PXVV0AR640000	N° 2 orifice kit - R290	
PXVV0AR650000	N° 3 orifice kit - R290	
PXVV0AR660000	N° 4 orifice kit - R290	
PXVV0AR670000	N° 5 orifice kit - R290	
PXVV0AR680000	N° 6 orifice kit - R290	
PXVV0AR690000	N° 7 orifice kit - R290	
PXVV0AR780000	N° 8 orifice kit - R290	
PXVV0AR790000	N° 9 orifice kit - R290	

Coils and connectors

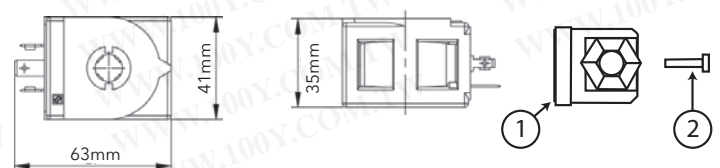
Part Number	Description	Refrigerants
PXVE0ARA60000	CO ₂ , EEV COIL 220/230 V~	R744
PXVB0ARA60000	EEV COIL 220/230 V~	R290, R22, R134a, R404A, R407C, R410A, R507
PXVB0ARA20000	EEV COIL 24 V~	R290, R22, R134a, R404A, R407C, R410A, R507
PXVB0AR020000	EEV COIL CONNECTOR IP65	All

Orifice kits



- 1: O-ring
- 2: Lock nut
- 3: O-ring
- 4: Orifice

Coils and connectors - dimensions



- 1: Seal
- 2: Connector securing screw
max torque 0.8 Nm



Applications

Pressure transducers or probes of the EWPA series are sensors that transmit a signal by way of a current output to the measuring instruments with which they are connected.

General specifications

	EWPA007	EWPA010	EWPA030	EWPA050
Operating range	0.5...8 bar (absolute)	0...10 bar (absolute)	0...30 bar (absolute)	0...50 bar (absolute)
Output signal	2 wires 4...20 mA	2 wires 4...20 mA	2 wires 4...20 mA	2 wires 4...20 mA
Overload	2 times pressure range	2 times pressure range	2 times pressure range	2 times pressure range
Power supply	8...32 Volts	8...32 Volts	8...32 Volts	8...32 Volts
Accuracy	± 0.5 % FS max (linearity, hysteresis, repeatability)	± 0.5 % FS max (linearity, hysteresis, repeatability)	± 0.5 % FS max (linearity, hysteresis, repeatability)	± 0.5 % FS max (linearity, hysteresis, repeatability)
Compensated temperature	0...50 °C	0...50 °C	0...50 °C	0...50 °C
Electrical connections	2 m cable, wired 2 m cable with PACKARD connector	2 m cable, wired 2 m cable with PACKARD connector	2 m cable, wired 2 m cable with PACKARD connector mPm connector	2 m cable, wired 2 m cable with PACKARD connector
Mechanical connections	male connector / female connector ¼ SAE (7/16"-20UNF)	male connector / female connector ¼ SAE (7/16"-20UNF)	male connector / female connector ¼ SAE (7/16"-20UNF)	male connector / female connector ¼ SAE (7/16"-20UNF)
Operating temperature	-40...100°C	-40...100°C	-40...100°C	-40...100°C
Global error at T 0...50 °C	± 1,0 % FS max	± 1,0 % FS max	± 1,0 % FS max	± 1,0 % FS max
Global error at T -10...80 °C	± 1,5 % FS max	± 1,5 % FS max	± 1,5 % FS max	± 1,5 % FS max
Response time	(0...99%) < 5ms	(0...99%) < 5ms	(0...99%) < 5ms	(0...99%) < 5ms
Material exposed to environment	AISI 316L Viton outer seal	AISI 316L Viton outer seal	AISI 316L Viton outer seal	AISI 316L Viton outer seal
Enclosure rating	Packard: IP67 Cable: IP54	Packard: IP67 Cable: IP54	Packard: IP67 mPm plug: IP65 Cable: IP54	Packard: IP67 Cable: IP54

Part numbers and specifications

Part number	Description	Cut-in	Electrical connection	IP
TD220030	EWPA 030	1/4 SAE MALE	2m cable	54
TD240030	EWPA 030	1/4 SAE MALE	2m cable with PACKARD connector	67
TD250030	EWPA 030	1/4 SAE MALE	mPm connector	65
TD320030	EWPA 030	1/4 SAE FEMALE	2m cable	54
TD340030	EWPA 030	1/4 SAE FEMALE	2m cable with PACKARD connector	67
TD220050	EWPA 050	1/4 SAE MALE	2m cable	54
TD240050	EWPA 050	1/4 SAE MALE	2m cable with PACKARD connector	67
TD320050	EWPA 050	1/4 SAE FEMALE	2m cable	54
TD340050	EWPA 050	1/4 SAE FEMALE	2m cable with PACKARD connector	67

Part Number	Description	Connection	Electrical connection	IP
TD220007	EWPA 007	1/4 SAE MALE	2m cable	54
TD240007	EWPA 007	1/4 SAE MALE	2m cable with PACKARD connector	67
TD320007	EWPA 007	1/4 SAE FEMALE	2m cable	54
TD340007	EWPA 007	1/4 SAE FEMALE	2m cable with PACKARD connector	67
TD320010	EWPA 010	1/4 SAE FEMALE	2m cable	54
TD340010	EWPA 010	1/4 SAE FEMALE	2m cable with PACKARD connector	67

EWPA 010 - 030 - 050 Ratiometric pressure transducers



Applications

EWPA ratiometric pressure transducers are sensors capable of transmitting a signal by way of a current output to the measuring instruments with which they are connected. They offer accurate performance across a wide temperature range.

General specifications

	EWPA010	EWPA030	EWPA050
Operating range at 0.5...4.5V	0...145 psi / 0...10 bar	0...515 psi / 0...35 bar	0...667 psi / 0...46 bar
Output signal	3 wires 0.5...4.5 V ratiometric	3 wires 0.5...4.5 V ratiometric	3 wires 0.5...4.5 V ratiometric
Overload	2.5 times pressure range	2.5 times pressure range	2.5 times pressure range
Power supply	5.0 V _{DC} ± 0.5 V	5.0 V _{DC} ± 0.5 V	5.0 V _{DC} ± 0.5 V
Accuracy	± 0.25 % FS max (linearity, hysteresis, repeatability)	± 0.25 % FS max (linearity, hysteresis, repeatability)	± 0.25 % FS max (linearity, hysteresis, repeatability)
Energy consumption	8 mA max	8 mA max	8 mA max
Load resistance	> 5KΩ	> 5KΩ	> 5KΩ
Electrical connections	2 m cable with PACKARD connector	2 m cable with PACKARD connector	2 m cable with PACKARD connector
Mechanical connections	female connection ¼ SAE (7/16"-20UNF)	female connection ¼ SAE (7/16"-20UNF)	female connection ¼ SAE (7/16"-20UNF)
Operating temperature	-40...125 °C	-40...125 °C	-40...125 °C
Global error at T 0...50 °C	± 1,0 % FS max	± 1,0 % FS max	± 1,0 % FS max
Global error at T -10...80 °C	± 1,5 % FS max	± 1,5 % FS max	± 1,5 % FS max
Response time	(0...99%) < 5ms	(0...99%) < 5ms	(0...99%) < 5ms
Material exposed to environment	AISI 316L Viton outer seal	AISI 316L Viton outer seal	AISI 316L Viton outer seal
Enclosure rating	IP67	IP67	IP67

Part numbers and specifications

p\n	description	connection	electrical connection
TD420010	EWPA 010	1/4 SAE FEMALE	2 m cable with PACKARD connector
TD420030	EWPA 030	1/4 SAE FEMALE	2 m cable with PACKARD connector
TD420050	EWPA 050	1/4 SAE FEMALE	2 m cable with PACKARD connector

EWHS284



EWHS304



EWHS314



Applications

Humidity probes of the EWHS284-304-314 series are intended for connection to humidity and humidity/temperature measuring instruments of superior dependability.

Common features

Ambient humidity: 0...100% RH • Maximum air speed: 20 m/s • Polarity inversion protection: diode

General specifications

	EWHS284	EWHS304	EWHS314
Enclosure rating	IP54	IP65	IP65
Installation	Use the clip supplied with the probe	via 2 external slots	via 2 external slots
Electrical connections	PVC two core cable	Screw terminals	Screw terminals
Dimensions:	103x25mm	80x80x52mm	80x80x52mm
Power supply	9...28V _m	9...30V _m	15...40V _m or 12...28V ₋
Current draw	20mA max	20mA max	<50mA max
Ambient temperature	-10...60 °C	-40...60 °C	-40...60 °C (-40...140 °F)
Humidity sensor	resistive	HygroMer* IN-1	HygroMer* IN-1
Humidity measurement range	15...90% RH	0...100% RH	0...100% RH
Output current of humidity measurement	4 (0%)...20mA (100%)	4 (0%)...20mA (100%)	4 (0%)...20mA (100%)
Response time in steady state (63%) at 23 °C	60 sec	typically 10 sec	typically 10 sec
Recovery time from saturation	360 sec	depending on air flow rate	depending on air flow rate
Storage temperature	-20...70 °C	-50...70 °C	-50...70 °C
Accuracy of humidity measurement (at 23°C):	±5% RH (in the range 15...90% RH)	±2% RH (in the range 10...95% RH) ±3% RH (for values <10% or >95% RH)	±2% RH
Number of wires per connection	2 (blue: power; brown: output)	2	4
Air filter	metal wire mesh	polyethylene	polyethylene
Temperature sensor	-	-	Pt100B
Temperature range	-	-	-40...60°C (-40...140°F)
Temperature measurement output current	-	-	4 (-30 °C)...20mA (70 °C)
Accuracy of temperature measurement (at 0 °C and 23 °C)	-	-	±0.3K
Temperature compensation	-	with NTC	with Pt100B
Connection cable	1m or 3m	-	-
Maximum load	250 Ohm	0 Ohm at 6V _m and 5V ₋ 500Ohm at 15V _m and 12V ₋	0 Ohm at 6V _m and 5V ₋ 500Ohm at 15V _m and 12V ₋
Part Number	EWHS284 - 1m cable: SN5PPN11613M0 EWHS284-3 3m cable: SN5PPN11313M0	EWHS304: SN5NPM1A614M0	EWHS314: SN0NPM1A614M0

PTC-Pt100-Pt1000 Temperature probes



Applications

Temperature probes, available in various models, are devices that provide the instruments to which they are connected with a temperature measurement by way of a physical process.

Common features

Accuracy of temperature measurement: +/- 1%

PTC

Part Number	Description	Capsule material	Capsule dimensions mm (ØxL)	Cable type	Enclosure rating	Dielectric strength	Operating range	Probe length
SN7T61502	PTC co-moulded with double insulated cable	AISI 304	6x40	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000	-50...+110 °C	1.5m
SN7DAE11502C0	PTC co-moulded with double insulated cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000	-50...+110°C	1.5 m
SN7DAE13002C0	PTC co-moulded with double insulated cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000	-50...+110 °C	3.0 m
SN7DED11502C0	PTC co-moulded with double insulated cable	Thermoplastic rubber	5x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000	-50...+110 °C	1.5 m
SN7DED13002C0	PTC co-moulded with double insulated cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000	-50...+110°C	3.0 m
SN6070000	PTC for ambient temperature	Plastic	15x70	-	IP54	-	-40...+120 °C	-
SN603008	PTC for piercing, with PVC grip	AISI 316	3x150	Silicone	IP65	-	-20...+110°C	3.0 m



Pt100

Part Number	Description	Capsule material	Capsule dimensions mm (ØxL)	Cable type	Enclosure rating	Operating range	Probe length
SN200009	Pt100, 3 wires with steel tube	AISI 316	6x100	vetrotex	IP44	0...+350 °C	3 m
SN206000	Pt100, 3 wires with steel tube	AISI 316	6x100	silicone	IP67	-40...200°C	3 m
SN2TAE51502C0	P100 with steel tube	AISI 304	6x50	thermoplastic rubber	IP68	-50...+1100 °C	1.5m

Pt1000

Part Number	Description	Capsule material	Capsule dimensions mm (ØxL)	Cable type	Enclosure rating	Dielectric strength	Operating range	Probe length
SN9S0A2500	Pt1000 with two wires	AISI 304	6x40	Silicone	IP67	2000V	-50...+200°C	2.5m
SN9DAE11502C6	PTC co-moulded with double insulated cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000V	-50...+110 °C	1.5m
SN9DAE13002C6	PTC co-moulded with double insulated cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000V	-50...+110 °C	3.0 m
SN9DED11502C6	PTC co-moulded with double insulated cable	Thermoplastic rubber	5x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000V	-50...+110°C	1.5m
SN9DED13002C6	PTC co-moulded with double insulated cable	Thermoplastic rubber	5x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000V	-50...+110°C	3.0 m

NTC - Temperature probes



Technical specifications

Part Number	Description	Capsule material	Capsule dimensions mm (Øx L)	Cable type	Enclosure rating	Dielectric strength	Operating range	Probe length
NTC co-moulded with double insulation								
SN8SAA1502	NTC with double insulation	AISI 304	6x40	Silicone	IP67	4000V	-50...+120 °C	1.5m
SN8PAA1500	NTC with double insulation	AISI 304	6x40	PVC	IP67	4000V	-30...+105 °C	1.5m
NTC co-moulded with double insulated cable								
SN8T6H0005	NTC co-moulded with double insulated cable	Thermoplastic rubber	20x5	Thermoplastic rubber, screened	IP68	2000V	-50...+110 °C	10.0 m
SN8T6H1505	NTC co-moulded with double insulated screened cable	Thermoplastic rubber	5x20	Thermoplastic rubber	IP68	2000V	-50...+110 °C	1.5m
SN8DED11502C0	NTC co-moulded with double insulated cable	Thermoplastic rubber	5x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000V	-50...+110 °C	1.5m
SN8DED13002C0	NTC co-moulded with double insulated cable	Thermoplastic rubber	5x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000V	-50...+110 °C	3.0 m
SN8DAE11502C0	NTC co-moulded with double insulated cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000V	-50...+110 °C	1.5m
SN8DAE13002C0	NTC co-moulded with double insulated cable	AISI 304	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000V	-50...+110 °C	3.0 m
SN8T6N1502	NTC co-moulded with double insulated cable	AISI 304	6x50	Thermoplastic rubber	IP68	2000V	-50...+110 °C	1.5 m



Technical specifications

NTC special versions								
Part Number	Description	Capsule material	Capsule dimensions (mm) ØxL	Cable type	Enclosure rating	Dielectric strength	Operating range	Probe length
SN8DEB21502C0	NTC clamp-on	Thermoplastic rubber	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000V	-50...+110 °C	1.5 m
SN8DEB23002C0	NTC clamp-on	Thermoplastic rubber	6x20	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP68	2000V	-50...+110 °C	3.0 m
SN8DNB11502A0	NTC clamp-on probe IP67 Fast response	Copper	4x16	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP67	1500V	-50...+110 °C	1.5m
SN8DAC11502AV	NTC probe Fast response	AISI 304	4x40	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP67	2000V	-50...+110 °C	1.5m
SN8DAC13002AV	NTC probe Fast response	AISI 304	4x40	Thermoplastic rubber (Outer) Polypropylene (Inner)	IP67	2000V	-50...+110°C	3.0 m

General specifications - TCK

SN400004	Tck	Inconel 600	6x200	TTS	IP45	-	-40...1150 °C	1m
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General specifications - TCJ

SN300000	Tcj	AISI 316	6x100	vetrotex	IP44	-	0...350°C	3m
SN300008	Tcj	AISI 316	6x100	vetrotex	IP44	-	0...350°C	1.5m

Temperature probe tables

PTC probe table

Ambient temperature		Temperature coefficient (%/K)	KTY81-121			
(°C)	(°F)		Resistance (Ohm)			Temperature error
			Minimum	Standard	Pressure	
-55	-67	0.99	471	485	500	±3.02
-50	-58	0.98	495	510	524	±2.92
-40	-40	0.96	547	562	576	±2.74
-30	-22	0.93	603	617	632	±2.55
-20	-4	0.91	662	677	691	±2.35
-10	14	0.88	726	740	754	±2.14
0	32	0.85	794	807	820	±1.91
10	50	0.83	865	877	889	±1.67
20	68	0.80	941	951	962	±1.41
25	77	0.79	980	990	1000	±1.27
30	86	0.78	1018	1029	1041	±1.39
40	104	0.75	1097	1111	1125	±1.64
50	122	0.73	1180	1196	1213	±1.91
60	140	0.71	1266	1286	1305	±2.19
70	158	0.69	1355	1378	1402	±2.49
80	176	0.67	1447	1475	1502	±2.80
90	194	0.65	1543	1575	1607	±3.12
100	212	0.63	1642	1679	1716	±3.46
110	230	0.61	1745	1786	1828	±3.83
120	248	0.58	1849	1896	1943	±4.33
125	257	0.55	1900	1950	2000	±4.66
130	266	0.52	1950	2003	2056	±5.07
140	284	0.45	2044	2103	1462	±6.28
150	302	0.35	2124	2189	2254	±8.55

NTC probe table

Ambient temperature (°C)	Resistance (KOhm)					
-50	102AT	202AT	502AT	103AT	203AT	503AT
-50	24.46	55.66	154.60	329.50	1253	3168
-45	18.68	42.17	116.50	247.70	890.50	2257
-40	14.43	32.34	88.91	188.50	642.00	1632
-35	11.23	26.96	68.19	144.10	465.80	1186
-30	8.834	19.48	52.87	111.30	342.50	872.80
-25	6.998	15.29	41.21	86.43	253.60	646.30
-20	5.594	12.11	32.44	47.77	190.00	484.30
-15	4.501	9.655	25.66	53.41	143.20	364.60
-10	3.651	7.763	20.48	42.47	109.10	277.50
-5	2.979	6.277	16.43	33.90	83.75	212.30
0	2.449	5.114	13.29	27.28	64.88	164.00
5	2.024	4.188	10.80	22.05	50.53	127.50
10	1.684	3.454	8.840	17.96	39.71	99.99
15	1.408	2.862	7.267	14.69	31.36	78.77
20	1.184	2.387	6.013	12.09	24.96	62.56
25	1.000	2.000	5.000	10.00	20.00	50.00
30	0.8486	1.684	4.179	8.313	16.12	40.20
35	0.7229	1.424	3.508	6.940	13.06	32.48
40	0.6189	1.211	2.961	5.827	10.65	26.43
45	0.5316	1.033	2.509	4.911	8.716	21.59
50	0.4587	0.8854	2.137	4.160	7.181	17.75
55	0.3949	0.7620	1.826	3.536	5.941	14.64
60	0.3446	0.6587	1.567	3.020	4.943	12.15
65	0.3000	0.5713	1.350	2.588	4.127	10.13
70	0.2622	0.4975	1.168	2.228	3.464	8.482
75	0.2285	0.4343	1.014	1.924	2.916	7.129
80	0.1999	0.3807	0.8835	1.668	2.468	6.022
85	0.1751	0.3346	0.7722	1.451	2.096	5.105
90	0.1536	0.2949	0.6771	1.266	1.788	4.345
95	-	-	0.5961	1.108	1.530	3.712
100	-	-	0.5265	0.9731	1.315	3.185
105	-	-	0.4654	0.8572	1.134	2.741
110	-	-	0.4128	0.7576	0.9807	2.369

NTC probe table - Extended range

Ambient temperature (°C)	Resistance (KOhm)		
	Minimum	Standard	Pressure
-40	321.654	333.562	345.877
-35	233.032	241.072	249.364
-30	170.611	176.082	181.710
-25	126.176	129.925	133.773
-20	94.221	96.807	99.454
-15	71.015	72.809	74.640
-10	54.004	55.253	56.525
-5	41.419	42.292	43.179
0	32.028	32.640	33.260
5	24.962	25.391	25.824
10	19.601	19.902	20.205
15	15.504	15.713	15.924
20	12.348	12.493	12.639
25	9.900	10.000	10.100
30	7.962	8.055	8.150
35	6.444	6.530	6.616
40	5.247	5.325	5.403
45	4.296	4.367	4.438
50	3.537	3.601	3.665
55	2.928	2.985	3.042
60	2.436	2.487	2.538
65	2.037	2.082	2.127
70	1.711	1.751	1.792
75	1.444	1.480	1.516
80	1.224	1.256	1.288
85	1.042	1.070	1.099
90	0.890	0.916	0.941
95	0.764	0.786	0.810
100	0.658	0.678	0.699
105	0.569	0.587	0.605
110	0.493	0.510	0.526
115	0.429	0.444	0.459
120	0.375	0.388	0.402
125	0.328	0.340	0.353
130	0.289	0.299	0.310
135	0.254	0.264	0.274
140	0.224	0.234	0.243
145	0.199	0.207	0.215
150	0.177	0.184	0.192

Pt100 probe table

Ambient temperature (°C)	Resistance (Ohm)	Ambient temperature (°C)	Resistance (Ohm)	Ambient temperature (°C)	Resistance (Ohm)	Ambient temperature (°C)	Resistance (Ohm)	Ambient temperature (°C)	Resistance (Ohm)
-200	18.52	20	107.79	230	186.84	440	260.78	650	329.64
-190	22.83	30	11.67	240	190.47	450	264.18	660	332.79
-180	27.10	40	115.54	250	194.10	460	267.56	670	335.93
-170	31.34	50	119.40	260	197.71	470	270.93	680	339.06
-160	35.54	60	123.24	270	201.31	480	274.29	690	342.18
-150	39.72	70	127.08	280	204.90	490	277.64	700	345.28
-140	43.88	80	130.90	290	208.48	500	280.98	710	348.38
-130	48.00	90	134.71	300	212.05	510	284.30	720	351.46
-120	52.11	100	138.51	310	215.61	520	287.62	730	354.53
-110	56.19	110	142.29	320	219.15	530	290.92	740	357.59
-100	60.26	120	146.07	330	222.68	540	294.21	750	360.64
-90	64.30	130	149.83	340	226.21	550	297.49	760	363.67
-80	68.33	140	153.58	350	229.72	560	300.75	770	366.70
-70	72.33	150	157.33	360	233.21	570	304.01	780	369.71
-60	76.33	160	161.05	370	236.70	580	307.25	790	372.71
-50	80.31	170	164.77	380	240.18	590	310.49	800	375.70
-40	84.27	180	168.48	390	243.64	600	313.71	810	378.68
-30	88.22	190	172.17	400	247.09	610	316.92	820	381.65
-20	92.16	200	175.86	410	250.53	620	320.12	830	384.60
-10	96.09	210	179.53	420	253.96	630	323.30	840	387.55
0	100.00	220	183.19	430	257.38	640	326.48	850	390.48
10	103.90								

Pt1000 probe table

Ambient temperature (°C)	Resistance (Ohm)	Ambient temperature (°C)	Resistance (Ohm)	Ambient temperature (°C)	Resistance (Ohm)	Ambient temperature (°C)	Resistance (Ohm)	Ambient temperature (°C)	Resistance (Ohm)
-200	185.281	20	1077.936	230	1868.465	440	2608.235	650	3297.246
-190	228.327	30	1116.731	240	1904.843	450	2642.196	660	3328.790
-180	271.029	40	1155.411	250	1941.106	460	2676.042	670	3360.219
-170	313.408	50	1193.976	260	1977.254	470	2709.773	680	3391.533
-160	355.484	60	1232.426	270	2013.287	480	2743.389	690	3422.731
-150	397.277	70	1270.961	280	2049.205	490	2776.889	700	3453.815
-140	432.903	80	1308.981	290	2085.007	500	2810.275	710	3484.783
-130	480.081	90	1347.085	300	2120.695	510	2843.545	720	3515.637
-120	521.127	100	1385.075	310	2156.267	520	2876.701	730	3546.375
-110	561.954	110	1422.949	320	2191.725	530	2909.741	740	3576.998
-100	602.578	120	1460.709	330	2227.067	540	2942.666	750	3607.506
-90	643.012	130	1498.353	340	2262.294	550	2975.476	760	3637.899
-80	683.267	140	1535.882	350	2297.406	560	3008.171	770	3668.177
-70	723.355	150	1573.296	360	2332.403	570	3040.751	780	3698.340
-60	763.286	160	1610.595	370	2367.285	580	3073.216	790	3728.387
-50	903.068	170	1647.779	380	2402.052	590	3105.565	800	3758.320
-40	842.71	180	1684.848	390	2436.703	600	3137.800	810	3788.137
-30	882.218	190	1721.801	400	2471.240	610	3169.919	820	3917.840
-20	921.6	200	1758.640	410	2505.661	620	3201.924	830	3847.427
-10	960.859	210	1795.363	420	2539.968	630	3233.813	840	3876.899
0	1000	220	1831.972	430	2574.159	640	3265.587	850	3906.256
10	1039.025								

TCJ probe table

Temp.	0°C	-10°C	-20°C	-30°C	-40°C	-50°C	-60°C	-70°C	-80°C	-90°C
-200°C	-7.890	-8.095	-	-	-	-	-	-	-	-
-100°C	-4.633	-5.037	-5.426	-5.801	-6.159	-6.500	-6.821	-7.123	-7.403	-7.659
0°C	0.000	-0.501	-0.995	-1.482	-1.961	-2.431	-2.893	-3.344	-3.786	-4.215
	10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C	100°C
0°C	0.000	0.507	1.019	1.537	2.059	2.585	3.116	3.650	4.187	4.726
100°C	5.269	5.814	6.360	6.909	7.459	8.010	8.562	9.115	9.669	10.224
200°C	10.779	11.334	11.889	12.445	13.000	13.555	14.110	14.665	15.219	15.773
300°C	16.327	16.881	17.434	17.986	18.538	19.090	19.642	20.194	20.745	21.297
400°C	21.848	22.400	22.952	23.504	24.059	24.610	25.164	25.720	26.276	26.834
500°C	27.393	27.953	28.516	29.080	29.647	30.216	30.788	31.362	31.939	32.519
600°C	33.102	33.689	34.279	34.873	35.470	36.071	36.675	37.284	37.896	38.512
700°C	39.132	39.755	40.382	41.012	41.645	42.281	42.919	43.559	44.203	44.848
800°C	45.494	46.141	46.786	47.431	48.074	48.715	49.353	49.989	50.622	51.251
900°C	51.877	52.500	53.119	53.735	54.347	54.956	55.561	56.164	56.763	57.360
1000°C	57.953	58.545	59.134	59.721	60.307	60.890	61.473	62.054	62.634	63.214
1100°C	63.792	64.370	64.948	65.525	66.102	66.679	67.255	67.831	68.406	68.980
1200°C	69.553	-	-	-	-	-	-	-	-	-

TCK probe table

Temp.	0°C	-10°C	-20°C	-30°C	-40°C	-50°C	-60°C	-70°C	-80°C	-90°C
-200°C	-5.730	-6.035	-6.158	-6.262	-6.344	-6.404	-6.441	-6.458	-	-
-100°C	-3.554	-3.852	-4.138	-4.411	-4.669	-4.913	-5.141	-5.354	-5.550	-5.730
0°C	0.000	-0.392	-0.778	-1.156	-1.527	-1.889	-2.243	-2.587	-2.920	-3.243
	10°C	20°C	30°C	40°C	50°C	60°C	70°C	80°C	90°C	100°C
0°C	0.000	0.397	0.798	1.203	1.612	2.023	2.436	2.851	3.267	3.682
100°C	4.096	4.509	4.920	5.328	5.735	6.138	6.540	6.941	7.340	7.739
200°C	8.138	8.539	8.940	9.343	9.747	10.153	10.561	10.971	11.382	11.795
300°C	12.209	12.624	13.040	13.457	13.874	14.293	14.713	15.133	15.554	15.975
400°C	16.397	16.820	17.243	17.667	18.091	18.516	18.941	19.366	19.792	20.218
500°C	20.644	21.071	21.497	21.924	22.350	22.776	23.203	23.629	24.055	24.480
600°C	24.905	25.330	25.755	26.179	26.602	27.025	27.447	27.869	28.289	28.710
700°C	29.129	29.548	29.965	30.382	30.798	31.213	31.628	32.041	32.453	32.865
800°C	33.275	33.685	34.093	34.501	34.908	35.313	35.718	36.121	36.524	36.925
900°C	37.326	37.725	38.124	38.522	38.918	39.314	39.708	40.101	40.490	40.885
1000°C	41.276	41.665	42.053	42.440	42.826	43.211	43.595	43.978	44.359	44.740
1100°C	45.119	45.497	45.873	46.249	46.623	46.995	47.367	47.737	48.105	48.473
1200°C	48.838	49.202	49.565	49.926	50.286	50.644	51.000	51.355	51.708	52.060
1300°C	52.410	52.759	53.106	53.451	53.795	54.138	54.479	54.819	-	-

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