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COMBIVAC CM 31/CM 32/CM 33



By combining two/three principles of measurement – absolute pressure sensor, Pirani and Penning – the COMBIVAC CM 31/CM 32/CM 33 cover the entire pressure range from 10^{-9} to 2000 mbar (10^{-9} to 1500 Torr) while offering monitoring and control functions.

Advantages to the User

- U Selectable dual LCD display combining the advantages of analog and digital readouts (over 12 decades)
- U Automatic switchover from THERMOVAC to Penning (cold cathode) operation
- U Clear display of pressure and operating status with analog trend indication, can also be read from a great distance
- U Easy to operate
- U Locking of the keypad via softlock keylock
- U Two adjustable switching thresholds with relay contact per measurement channel
- U Logarithmic/linear 0 to 10 V chart recorder output
- U Compact, rugged Penning gauge which is capable of withstanding operation at high pressures (see section “Sensors”)
- U Aligned and temperature compensated THERMOVAC sensors (see section “Sensors”)
- U Precision absolute pressure sensors with ceramics or Inconel diaphragm (see section “Sensors”)
- U Cost-effective replacement sensing cells and electrodes
- U Fault indication for each channel in the event of a broken filament, a broken cable or failed plasma discharge
- U Compact bench-top unit (1/4 19", 3 HU) with metal enclosure, which may also be installed in panel cut-outs and 19" racks
- U Full remote control via RS 232 C interface
- U CE mark

Typical Applications

- U General pressure measurements on pump systems, for example:
 - Turbomolecular pump systems
 - Diffusion pump systems
 - Cryo pump systems
- U Vacuum melting, soldering and annealing furnaces
- U Coating systems
- U Analytical instruments

COMBIVAC CM 31

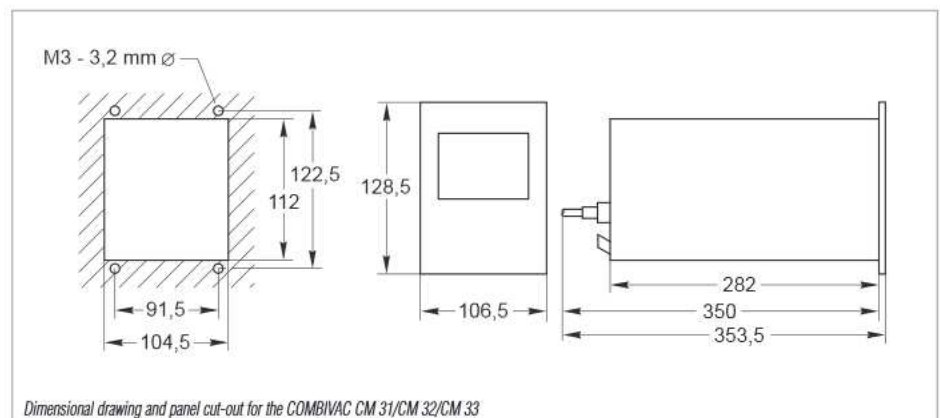
This combination instrument for standard applications covers with its three measurement channels (2 x THERMOVAC and 1 x PENNINGVAC) the entire range of 12 decades between 1×10^{-9} and 1000 mbar.

COMBIVAC CM 32

For over-pressure measurements and pressure measurements which do not depend on the type of gas, the CM 32 offers the facility of connecting a linear absolute pressure sensor (DI 200/201/2000/2001 – see section “Sensors”) in combination with THERMOVAC and PENNINGVAC sensors. Suitable 4 to 20 mA pressure sensors having a range up to 20000 mbar (15000 Torr) may be connected.

COMBIVAC CM 33

If the utmost is required regarding accuracy and resolution, then the CM 33 is the right choice. In combination with THERMOVAC and PENNINGVAC sensors, capacitive absolute pressure sensors may be connected (see section “Sensors”) which offer, depending on the type, a range of 2×10^{-4} to 13300 mbar (1.5×10^{-4} to 10000 Torr).



Technical Data		COMBIVAC CM 31/32/33		Ordering Information		COMBIVAC CM 31/32/33	
Number of measurement channels		3		CM 31, with 2 m long main cord, 230 V AC		Part No. 157 89	
Display range, CM 31 CM 32 CM 33	mbar (Torr)	1 x 10 ⁻⁹ to 1000 (0.75 x 10 ⁻⁹ to 750)		CM 32, with 2 m long main cord, 230 V AC		Part No. 157 90	
	mbar (Torr)	1 x 10 ⁻⁹ to 2000 (or 20 000*) (0.75 x 10 ⁻⁹ to 1500 (or 15 000*))		CM 33, with 2 m long main cord, 230 V AC		Part No. 157 95	
	mbar (Torr)	1 x 10 ⁻⁹ to 1330 (or 13 300*) (0.75 x 10 ⁻⁹ to 998 (or 9980*))		Options			
Unit of measurement (selectable)		mbar, Torr, Pa, Micron		19" installation frame		Part No. 161 00	
Measurement uncertainty				1/4 19" blank panel		Part No. 161 02	
PENNINGVAC		±30 % of the meas. value in the range 10 ⁻⁸ to 10 ⁻⁴ mbar/Torr		THERMOVAC sensors for CM 31/32/33			
THERMOVAC		≤ 20 % of the meas. value in the range 10 ⁻³ to 10 ⁻² mbar/Torr		TR 211, DN 16 KF		Part No. 157 85	
		≤ 15 % of the meas. value in the range 10 ⁻² to 10 ² mbar/Torr		TR 211, 1/8" NPT		Part No. 896 33	
Absolute pressure sensor		Depending on the type of sensor used		TR 212, DN 16 KF		Part No. 158 52	
Measurement display (backlit)		digital, 7 segment LCD, analog, LCD bar graph, with logarithmic divisions (selectable)		TR 216, DN 16 KF		Part No. 157 87	
Type of gas (selectable)		Air, N ₂ , Ar		Cable for TR sensors		5 m	
Switching thresholds		6, 2 per channel, floating changeover contacts		10 m		Part No. 162 27	
Operating mode		single, interval		20 m		Part No. 162 28	
Adjustment range				30 m		Part No. 124 35	
PENNINGVAC		1 x 10 ⁻⁸ to 9.9 x 10 ⁻³ (0.75 x 10 ⁻⁸ to 7.4 x 10 ⁻³)		40 m		Part No. 124 36	
THERMOVAC		5 x 10 ⁻³ to 500 (3.75 x 10 ⁻³ to 375)		50 m		Part No. 124 37	
Hysteresis for the switching relay		standard 10 % of trigger value, free adjustable for THERMOVAC and PENNINGVAC		75 m		Part No. 124 38	
Ready indication		1 contact per channel, closed when ready		100 m		Part No. 124 39	
Rating of the relay contacts		AC 240 V/5A (Resistive load) DC 60 V/0.7 A (Resistive load)		PENNINGVAC sensors for CM 31/32/33			
Contact life at 5 A		≥ 6 x 10 ⁴ cycles		PR 25, DN 25 KF		Part No. 157 52	
Chart recorder output (Ra ≥ 2.5 kΩ)				PR 26, DN 40 KF		Part No. 136 46	
PENNINGVAC		0 to 10 V, log./lin. divisions logarithm.: (0 V ; 1 x 10 ⁻⁹ mbar/Torr), 1.43 V/decade		PR 27, DN 40 CF		Part No. 136 48	
THERMOVAC		linear: 3 decades, about 10.5 V for fault logarithm.: (0 V ; 1 x 10 ⁻³ mbar/Torr), 1.67 V/decade		PR 37, DN 40 CF, ausheizbar		Part No. 157 54	
Absolute pressure sensor		linear: 3 decades, about 10.5 V for fault log./lin. 0 to 10 V		Replacement cathode plates for PR 25 (Set of 5 pcs.)		Part No. 162 94	
Control input for PENNINGVAC		Prog. contr. compatible digital 24 V input Logic level (LOW) < 7 V, 0 A; (HIGH) > 13 V, 7 mA		Cable for PR sensors		5 m	
Interface		RS 232 C		10 m		Part No. 162 88	
Main connection 50/60 Hz				20 m		Part No. 162 89	
CM 31/32 (selectable)		V		30 m		Part No. 157 56	
CM 33		V		40 m		Part No. 124 50	
Power consumption		VA		50 m		Part No. 124 51	
Storage temperature range		°C		75 m		Part No. 124 52	
Nominal temperature range		°C		100 m		Part No. 124 53	
Max. rel. humidity		% n.c.		Absolute pressure sensors for CM 32			
Weight		kg (lbs)		DI 200, 200 mbar, DN 16 KF, incl. 5 m long cable		Part No. 158 12	
Dimensions (W x H x D)		mm		DI 201, 200 mbar, DN 16 KF, incl. 5 m long cable		Part No. 158 14	
				DI 2000, 2000 mbar, DN 16 KF, incl. 5 m long cable		Part No. 158 13	
				DI 2001, 2000 mbar, DN 16 KF, incl. 5 m long cable		Part No. 158 25	
				Absolute pressure sensors for CM 33			
				CTR90, 1 Torr, DN 16 KF		Part No. 159 24	
				CTR90, 10 Torr, DN 16 KF		Part No. 159 23	
				CTR90, 100 Torr, DN 16 KF		Part No. 159 22	
				CTR90, 1000 Torr, DN 16 KF		Part No. 159 21	
				CTR90, 1 Torr, DN 16 CF		Part No. 159 34	
				CTR90, 10 Torr, DN 16 CF		Part No. 159 33	
				CTR90, 100 Torr, DN 16 CF		Part No. 159 32	
				CTR90, 1000 Torr, DN 16 CF		Part No. 159 31	
				Sensor cables		5 m	
				10 m		Part No. 157 64	
				15 m		Part No. 124 41	
				20 m		Part No. 124 42	
				30 m		Part No. 124 43	
				40 m		Part No. 124 44	
				50 m		Part No. 124 45	
				75 m		Part No. 124 46	
				100 m		Part No. 124 47	



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