ME790/MEP790 datasheet

MONOLITHIC, PIEZORESISTIVE CERAMIC PRESSURE TRANSDUCER

Metallux ME790 and MEP790 pressure sensors are made with a monolithic ceramic cell and they work following the piezoresistive principle. The Wheatstone bridge is screen printed directly on one side of the ceramic cell by means of Thick Film technology and signal conditioning electronics generates 0.5...4.5 V ratiometric output. Pressure and temperature calibration is done electronically with the on-board ASIC and it can be performed in bar (ME790) or in psi (MEP790).
Electronics provides offset and span correction when the temperature changes. Zero correction software to compensate offset shift due to final customer assembly available on request. This allows good precision and long-term stability.
The Metallux ME790 family meets EMC requirements. The ASIC EEPROM stores production lot specific data for sensor traceability and it allows custom calibration.
Due to the excellent chemical resistance of the Al_2O_3 ceramic, the ME790 sensors are suitable for nearly all aggressive media.

FEATURES

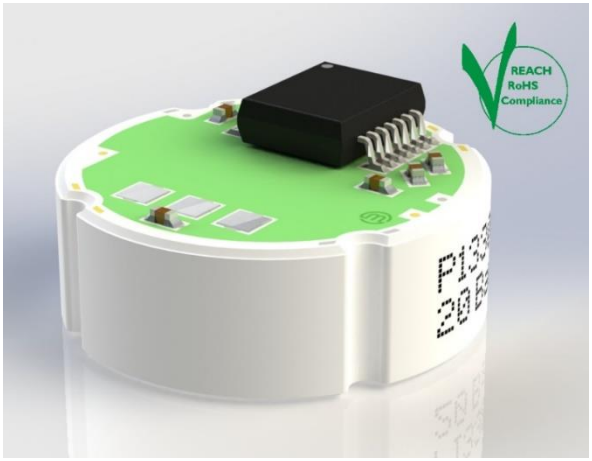
Excellent resistance to corrosion and abrasion

Fully integrated signal conditioning

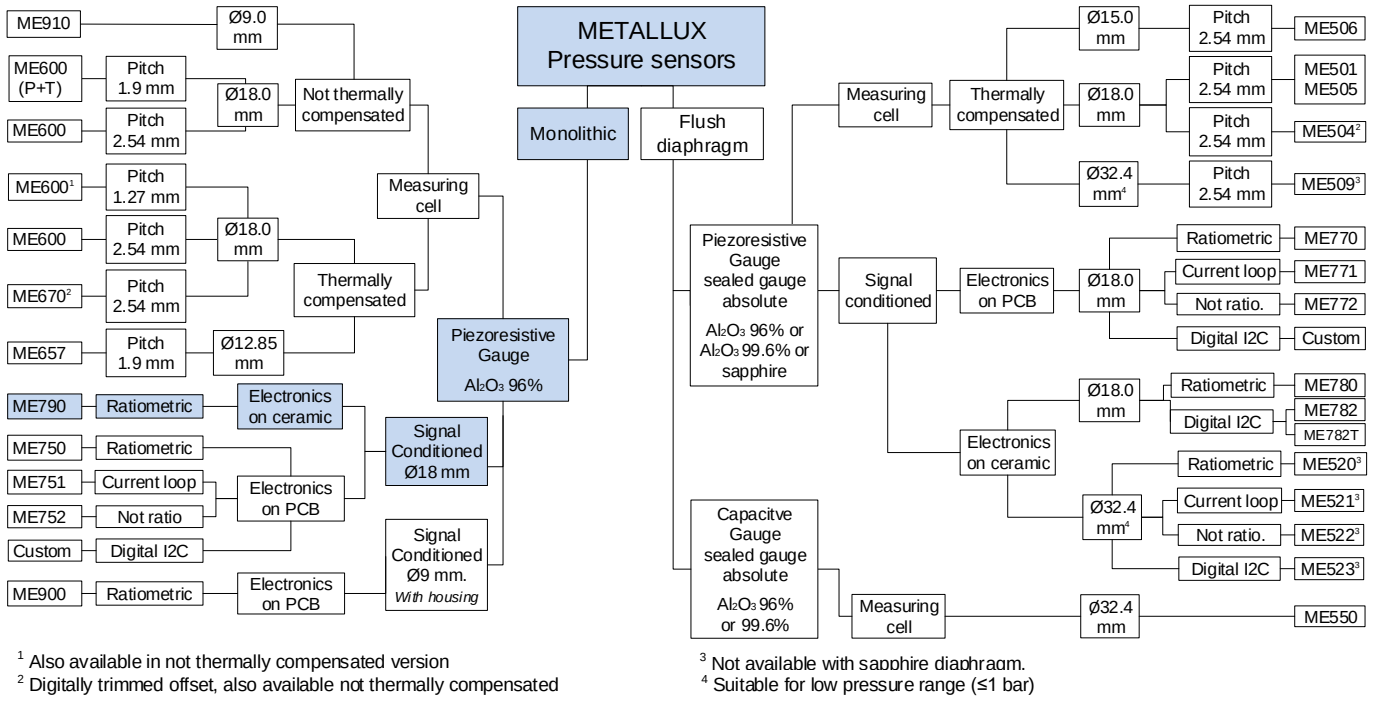
EMC compliant

Thermally compensated

Zero stress mounting software



Pressure sensors family tree



[1] Also available in not thermally compensated version
[2] Digitally trimmed offset, also available not thermally compensated
[3] Not available with sapphire diaphragm.
[4] Suitable for low pressure range (≤1 bar)

Technical characteristics

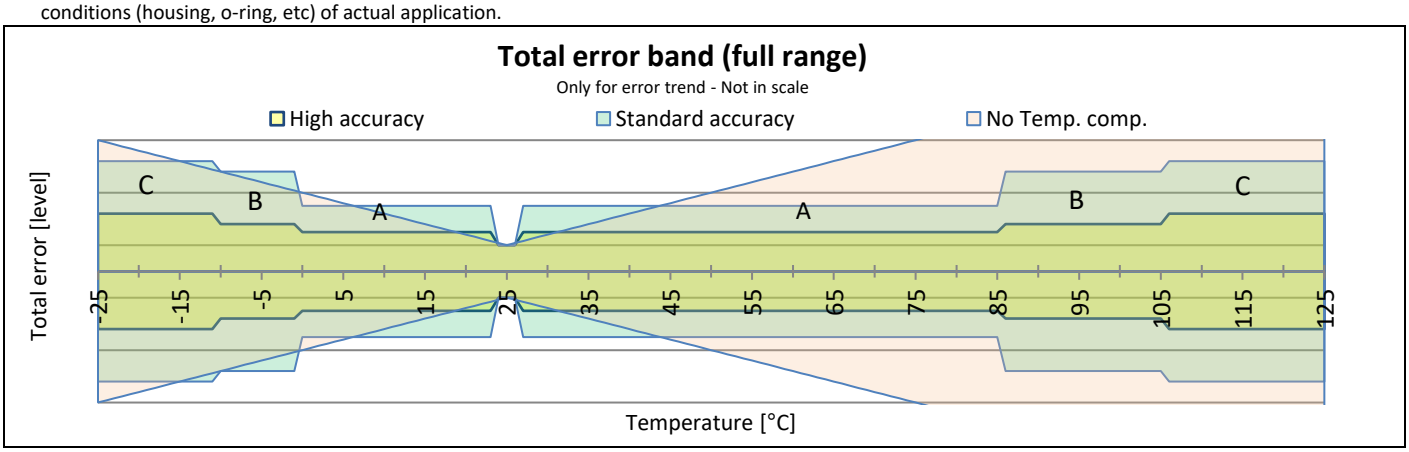
Parameters	Units	ME790 / MEP790
Output	-	Ratiometric
Output range	-	0.5...4.5 [V]
Sensor type	-	Monolithic, gauge
Technology	-	Piezoresistive with electronic signal conditioning
Diaph. material	-	Ceramic Al_2O_3 96%
Weight	g	≤ 6 (excluding connections)
Response time	ms	≤ 5
Supply voltage	VDC	4.5...5.5
Max current[1]	mA	6 (R_{LOAD} ≥ 2 kΩ)
Operating temp.	°C	-25...+125 (-13 °F...+257 °F)
Storage temp.	°C	-40...+135 (-40 °F...+275 °F)
Compliant with	-	Reach, RoHS, Conflict Minerals free
EMC/ESD[2] compliances	-	Electrostatic discharge immunity — IEC/EN 61000-4-2(2009) Radiated electromagnetic field immunity — IEC/EN 61000-4-3(2006) Electrical fast transient (burst) immunity — IEC/EN 61000-4-4(2004) [2] Surge immunity — Not applicable Conducted RF immunity immunity — IEC/EN 61000-4-6(2014)

Pressure range			ME790 / MEP790								
Nominal Pressure[3]	ME	bar	5	10	20	50	100	200	250	400	600
	MEP	*psi*[4]	*100*	*150*	*400*	1000	*1500*	*3000*	*4000*	*5000*	*8500*
Overload pressure		bar	10	20	40	100	150	300	375	500	700
		psi	*145*	*290*	*580*	1450	*2175*	*4350*	*5440*	*7250*	*10150*
Burst pressure		bar	20	35	60	140	300	400	500	650	800
		psi	*290*	*507*	*870*	2030	*4350*	*5800*	*7250*	*9425*	*11600*
Vacuum capability		bar	-0.9	-0.9	-1	-1	-1	-1	-1	-1	-1
		psi	*-13.1*	*-13.1*	*-14.5*	*-14.5*	-14.5	*-14.5*	*-14.5*	*-14.5*	*-14.5*

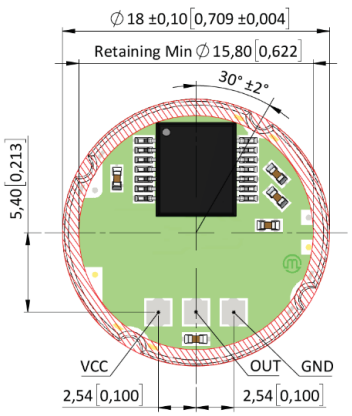
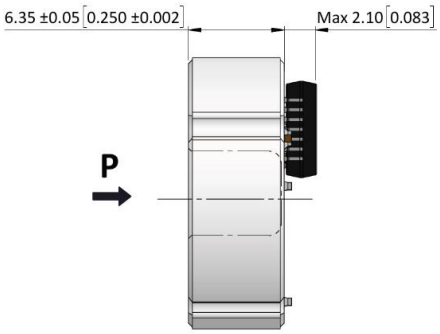
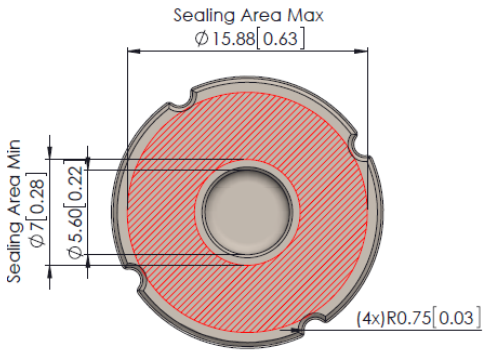
Accuracy [5] [%FS]		Calibration with high accuracy					
25°C	(77 °F)	1.0					1.5
A) 0...85°C	(32...185 °F)	1.5	1.4	1.6	1.8	2.4	2.4
B)-10...105°C	(14...221 °F)	1.8	1.7	1.8	2.2	2.6	2.6
C)-25...125°C	(-13...257°F)	2.2	2	2.2	2.5	3.5	3.5
Accuracy [5] [%FS]		**Calibration with standard accuracy**					
25°C	(77 °F)	1.0					1.5
A) 0...85°C	(32...185 °F)	2.5	2.4	2.6	2.8	3.4	3.4
B)-10...105°C	(14...221 °F)	3.8	3.7	3.8	4.2	4.6	4.6
C)-25...125°C	(-13...257°F)	4.2	4.0	4.2	5.5	5.5	5.5
Accuracy [5] [%FS]		**Calibration without thermal compensation**					
25°C	(77 °F)	1.0					1.5
-25...125 °C	(-13...257°F)	Max ± 0.08 %FS/K (Ceramic cell thermal offset shift + thermal span shift) + Accuracy at 25°C					

Unless indicated, all data are based on a reference temperature of 25°C and a power supply of 5 VDC.

1. During calibration or auto-zero, current consumption is < 30 mA
2. All EMC/ESD test are performed in grounded Metallux housing. EFT/Burst level is according to EN 61326-1:2013
3. Pressure ranges not listed in the technical chart have performances of the nearest listed pressure range. Contact us for customization.
4. Psi values are not the exact conversion of bar value. PSI ranges are defined to cover different standard values.
5. Accuracy includes room temperature error of non-linearity, hysteresis and non-repeatability, offset and span deviation PLUS thermal span shift and thermal offset shift. Accuracy calculation is performed in Metallux housings; accuracy excludes temperature hysteresis which primarily depends on mechanical conditions (housing, o-ring, etc) of actual application.

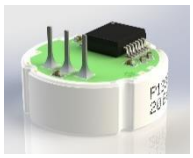


Mechanical drawings

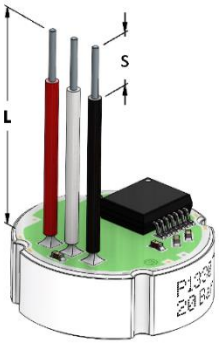
Top View	Side View	Bottom View (3...400 bar – 50...5000 psi)
Type 0 version. 		
3x Pads 1.6 x 1.6 [0,063 x 0.063] Pitch=2.54 [0.1]	NOTE: see below for springs or connector height.	For Oring calculation consider misalignments.
All quotes are in mm [inch] – General tolerance ISO 2768-1 M		

Electrical terminations

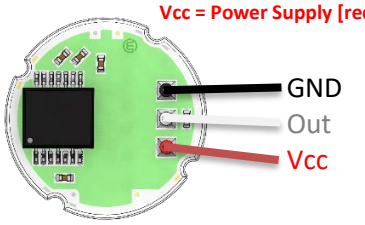
ME790: type 0, wires L= 50.8 mm; **type 9**, pins L = 9 mm



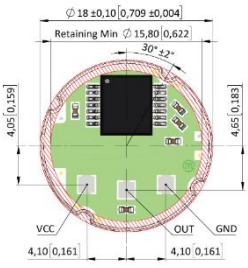
Wire section : 0.09mm²
Cable length: L = 50.8 ± 2 [2 ± 0.08]
Stripped wire length: S = 5.0 ± 0.5 [0.2 ± 0.02]
Soldered pins length: L = 9.0 ± 0.5 [0.35 ± 0.02]
Pitch: 2.54 ± 0.10 [0.100 ± 0.004]



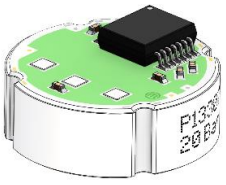
GND = Ground [black]
Out = Output voltage [white]
Vcc = Power Supply [red]

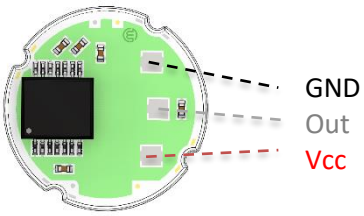


ME790: type 1, tinned pads



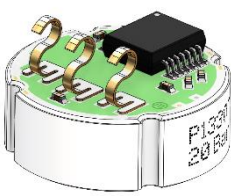
Pitch: 4.10 ± 0.05 [0.161 ± 0.002]
Max. tin solder thickness: 0.3 [0.01]

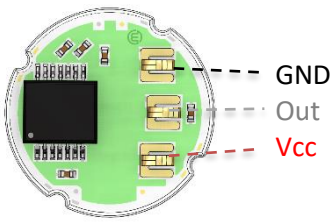




ME790: type 9, springs (contact us for customization)

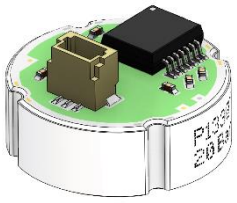
Pitch: 4.10 ± 0.10 [0.161 ± 0.004]
Compr. force: 6...9 N to have 4.5mm [0.177]
Springs height: 4.9 ± 0.2 [0.193 ± 0.008]

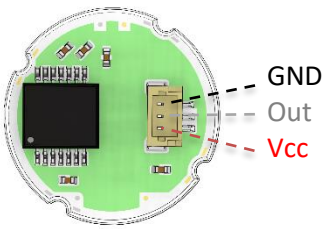




ME790: type 9, connector (contact us for customization)

Pitch: 1.00 ± 0.10 [0.039 ± 0.004]
Connector type: BM03B-SRSS-TBT 3 poles
Op. Temp: -25°C...+85°C (-13 °F...185 °F)
Connector height: 4.25 ± 0.15 [0.167 ± 0.006]



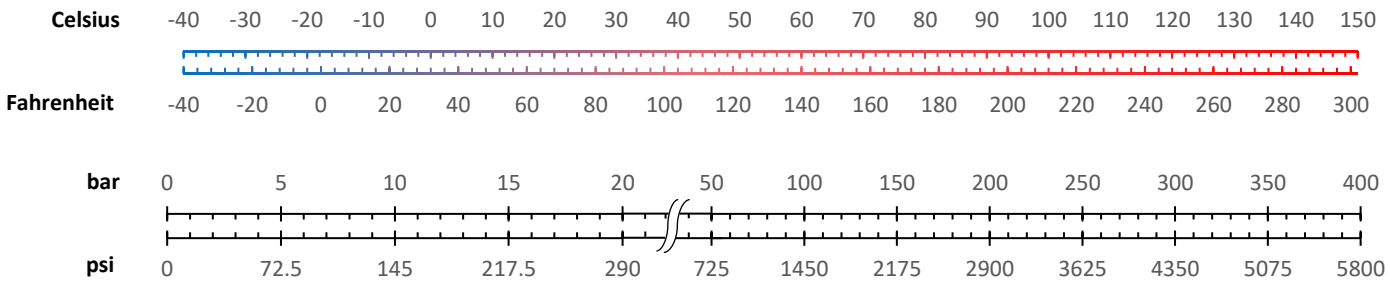


All quotes are in mm [inch] – General tolerance ISO 2768-1 M

Ordering code

	ME	_	790	_ _ _	_	_	_
Pressure unit							
	bar	blank					
	psi	P					
Pressure range							
	ME	MEP		ME – MEP			
	0...5 bar	or 0...100 psi		005 – 100			
	0...10 bar	or 0...150 psi		010 – 150			
	0...20 bar	or 0...400 psi		020 – 400			
	0...50 bar	or 0...1000 psi		050 – 1k0			
	0...100 bar	or 0...1500 psi		100 – 1k5			
	0...200 bar	or 0...3000 psi		200 – 3k0			
	0...250 bar	or 0...4000 psi		250 – 4k0			
	0...400 bar	or 0...5000 psi		400 – 5k0			
	0...600 bar	or 0...8500 psi		600 – 8k5			
	Others on request (enquiry for customization)			999 – 999			
Calibration							
	High accuracy				0		
	Standard accuracy				1		
	No temperature compensation (calibration done at room temperature)				2		
	Not calibrated, not compensated (electrical test only)				3		
	Others on request (enquiry for customization)				9		
Termination type							
	Wires 50.8 mm					0	
	Tinned pads					1	
	Others on request (springs, pins 9mm, SMD connector, others)					9	
Coating							
	Standard conformal coating						Blank
	Parylene or other coating (enquiry for customization)						Custom

Conversion tools



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To be disposed of according to local regulations (OTRif 16 02 97 for Switzerland, CER 16 02 16 for European Union)