



Multifunction Calibrator

CL561

\$3300

Basic Unit



CL561 is a modular all-in-one multifunction calibrator that can be fully equipped with all the temperature, pressure, and electrical modules and options presented in the following pages, or upgraded with modules and/or options as requirements arise.

- ✔ Multifunction Calibrator: Temperature, Pressure, Electrical Measurement (mA, mV, V, Ohm, Hz)
- ✔ Multiple Datalogging Channels (Optional)
- ✔ Field Entry of Data and Text
- ✔ Hart® Communication (Optional)
- ✔ NIST Certificate Included
- ✔ 10 Hours (Average) of Battery Operation. Rechargeable Battery Pack Included



CL562 shown smaller than actual size



OMEGACARESM extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARESM covers parts, labor and equivalent loaners

Multifunction Calibrator (cont'd)



Electrical Module (Included With All Models)

The electrical module (E), which is galvanically isolated from all the other modules, measures electrical quantities including frequency. Additionally it counts pulses and detects the state of switches (opening and closing values). It includes a +24V DC loop supply and also generates current.

The E module hosts the optional Hart® modem which allows digital communications with instruments which support the Hart® protocol. CL561 automatically includes an internal modem plus 250 Ohm resistor needed for Hart® communication when the +24V DC loop supply is used.

E Module Features

- ✓ Voltage Measurement
- ✓ Pulse Counting
- ✓ Low Voltage Measurement
- ✓ Frequency Measurement
- ✓ Current Measurement
- ✓ Switch Testing
- ✓ Current Generation
- ✓ +24V DC Loop Supply
- ✓ Hosts the Hart® Communication (Optional)

Electrical Module (E)			
Function	Range	Resolution	1 Year Uncertainty (\pm) ¹
mV measurement ²	± 1000 mV	0.001 - 0.01 mV	0.02% RDG + 5 μ V
V measurement ³	± 50 V	0.00001 - 0.001 V	0.02% RDG + 0.25 mV
mA measurement ⁴	± 100 mA	0.0001 - 0.001 mA	0.02% RDG + 1.5 μ A
Hz measurement ⁵	0.0028 to 50000 Hz	0.000001 - 0.1 Hz	0.01% RDG
Pulse counting ⁵	0 to 9,999,999 pulses	1 pulse	N/A
mA generation ⁶	0 to 25 mA	0.0001 mA	0.02% RDG + 1.5 μ A

1) Uncertainty includes reference standard uncertainty, hysteresis, nonlinearity, repeatability and typical long term stability for mentioned period. (k=2)

2) Bias current <10 nA

3) Impedance >1 Mohm

4) Impedance < 7.5 ohm

5) Impedance > 1 Mohm. Frequency measurement minimum amplitude 0.5 Vpp (< 5 kHz), 1 Vpp (5 to 50 kHz).

Pulse counting minimum amplitude 0.5 Vpp (pulse length > 100 μ s), 1 Vpp (pulse length 100 μ s to 10 μ s), Trigger level range -1 to +15 V.

6) Maximum load impedance 800 ohm

PRESSURE MODULES (INT & EXT) (Optional, ordered with base unit or field installable)

CL561 can have up to three (3) internal pressure modules. All the internal pressure modules, up to INT6C, are equipped with relief valves as overpressure protection. This together with the possibility to also use external pressure modules, gives CL561 a unique pressure calibration capability.

A unit fitted with the barometric module allows all other pressure modules to also measure absolute pressure. The pressure modules incorporate advanced pressure measurement technology, which means that only a few modules are needed to cover a very wide pressure range with excellent uncertainty.

CL561 supports more than 30 different pressure units as standard.



Internal (INT) & External (EXT) Pressure Modules

Internal Modules	External Modules	Unit	Range ²	Resolution	90 Days Uncertainty (\pm) ¹	1 Year Uncertainty (\pm) ¹
INT B	EXT B	kPa a mbar a psi a	80 to 120 800 to 1200 11.6 to 17.4	0.01 0.1 0.001	— — —	0.05 kPa 0.5 mbar 0.0073 psi
INT400mC	—	kPa mbar iwc	± 40 ± 400 ± 160	0.001 0.01 0.001	0.025% RDG + 0.02% FS	0.04% RDG + 0.02%
INT2C	—	kPa bar psi	-100 to 200 -1 to 2 -14.5 to 30	0.001 0.00001 0.0001	0.025% RDG + 0.01% FS	0.04% RDG + 0.01% FS
INT6C	—	kPa bar psi	-100 to 600 -1 to 6 -14.5 to 90	0.01 0.0001 0.001	0.025% RDG + 0.01% FS	0.04% RDG + 0.01% FS
INT20C	—	kPa bar psi	-100 to 2000 -1 to 20 -14.5 to 300	0.01 0.0001 0.001	0.025% RDG + 0.01% FS	0.04% RDG + 0.01% FS
INT60	—	kPa bar psi	0 to 6000 0 to 60 0 to 900	0.1 0.001 0.01	— — —	0.04% RDG + 0.01% FS
—	EXT160	MPa bar psi	0 to 16 0 to 160 0 to 2400	0.0001 0.001 0.01	— — —	0.04% RDG + 0.013% FS
—	EXT250	MPa bar psi	0 to 25 0 to 250 0 to 3700	0.001 0.01 0.1	— — —	0.04% RDG + 0.015% FS
—	EXT600	MPa bar psi	0 to 60 0 to 600 0 to 9000	0.001 0.01 0.1	— — —	0.04% RDG + 0.015% FS

1) Uncertainty includes reference standard uncertainty, hysteresis, nonlinearity, repeatability and typical long term stability for mentioned period. ($k=2$)

2) Every internal/external pressure module's range may be displayed also in absolute pressure if the Barometric Module (B) is installed.

Supports the following pressure units as standard: Pa, hPa, kPa, MPa, mbar, bar, lbf/ft², psi, gf/cm², kgf/cm², kgf/m², kp/cm², at, mm H₂O, cm H₂O, m H₂O, iwc, ft H₂O, mm Hg, cm Hg, m Hg, in Hg, mm Hg(0°C), in Hg(0°C), mm H₂O (4°C), in H₂O (4°C), ft H₂O (4°C), in H₂O (60°F), mm H₂O (68°F), in H₂O (68°F), ft H₂O (68°F), torr, atm.

Pressure modules 20bar and below, pressure connection G 1/8 (ISO 228/1) 60° internal cone.

INT60, INT100, INT160 module pressure connection G 1/8 (ISO 228/1) female.

EXT60, EXT100, EXT160, EXT250, EXT600, EXT1000 pressure module pressure connection G 1/4 (ISO 228/1) male.

Wetted parts AISI316 stainless steel, Hastelloy, Nitrile rubber.

In the INT20C, EXT20C, INT60, EXT60, INT100, EXT100, INT160, EXT160 and EXT250 the maximum overpressure is twice the range.

The maximum overpressure for EXT600 is 900 bar and for EXT1000 1100 bar.



Shown with optional external pressure module (see chart above)

Multifunction Calibrator (cont'd)



TEMPERATURE ELECTRICAL MODULE (ET) (Included with the CL562)

With the temperature and electrical module (ET) you can simulate and measure a great variety of RTD's and thermocouples. Additionally you can generate electrical signals including frequency and pulses as well as measure and generate / simulate mV and ohm signals with the same module.

Both the ITS90 and IPTS68 International Temperature Scales are selectable from the configuration menu in the CL562.

The ET module hosts the reference junction (RJ) module. The RJ module operates using advanced temperature measurement technology providing very accurate internal cold junction compensation when measuring or simulating thermocouples. The unique design of the RJ module makes it possible to use practically any connector type or plain TC wires.

ET Module Features

- ✓ RTD Measurement/Simulation
- ✓ Frequency Generation
- ✓ Resistance Measurement/Simulation
- ✓ Pulse Generation
- ✓ Thermocouple Measurement/Simulation
- ✓ Voltage Generation
- ✓ Low Voltage Measurement/Generation
- ✓ Current Generation
- ✓ Hosts the Optional Internal Reference Junction Module (RJ)

Temperature Electrical Module (ET)			
Function	Range	Resolution	1 Year Uncertainty (\pm) ¹
mV generation ²	± 500 mV	0.001 - 0.01 mV	0.02% RDG + 4 μ V
V generation ³	± 12 V	0.00001 - 0.0001 V	0.02% RDG + 0.1 mV
mA generation ⁴	± 25 mA	0.0001 mA	0.02% RDG + 1 μ A
Hz generation ⁵	0.00028 to 50000 Hz	0.000001 - 0.1 Hz	0.01% RDG
Pulse generation ⁶	0 to 9,999,999 pulses	1 pulse	N/A
Ohm simulation ⁷	1 to 4000 ohm	0.01 - 0.1 ohm	0.04% RDG or 30 mohm ⁸
Ohm measurement ⁹	0 to 4000 ohm	0.001 - 0.1 ohm	0.02% RDG + 3.5 mohm
mV measurement ¹⁰	± 500 mV	0.001 - 0.01 mV	0.02% RDG + 4 μ V

1) Uncertainty includes reference standard uncertainty, hysteresis, nonlinearity, repeatability and typical long term stability for mentioned period. ($k=2$)

2) Load effect < 5 μ V/mA. Maximum output current 5 mA.

3) Load effect < 100 μ V/mA. Maximum output current 10 mA (0 .. 10 V), 3 mA (10 .. 12 V).

4) Maximum load impedance 400 ohm.

5) Amplitude range 0 .. 12 Vpp. Amplitude setting accuracy up to 5 kHz \pm (200 mV + 5% of set value). Waveforms: Square wave (positive / symmetric) and sinewave (above 40 Hz).

6) Pulse generation frequency range 0.1 ... 1000 Hz. Amplitude setting 0 ... 12 Vpp.

7) Valid with measurement current 0.2 ... 5 mA (1 ... 1000 ohm), 0.1 .. 1mA (1 ... 4 kohm). Ohm/RTD simulation speed 1 ms.

8) Which ever is greater.

9) Specification valid with 4 wire connection. In 3 wire connection add 10 mohm.

10) Bias current < 10 nA.

RTD Measurement and Simulation				
Type	Range ($^{\circ}$ C)	Range ($^{\circ}$ C)	Measurement 1 Year Uncertainty (\pm) ¹	Simulation 1 Year Uncertainty (\pm) ¹
Pt-sensors	-200 to 850 $^{\circ}$ C	-200 to 0 $^{\circ}$ C 0 to 850 $^{\circ}$ C	0.06 $^{\circ}$ C 0.025% RDG + 0.06 $^{\circ}$ C	0.1 $^{\circ}$ C 0.025% RDG + 0.1 $^{\circ}$ C

Resolution 0.01 $^{\circ}$ C.

Additional RTD Types Included

- Pt50 (385)
- Pt400 (385)
- Pt100 (3923)
- Pt100 (391)
- Ni100 (618)
- Pt100 (385)
- Pt500 (385)
- Pt100 (389)
- Pt100 (375)
- Ni120 (672)
- Pt200 (385)
- Pt1000 (385)
- Pt100 (3926)
- Cu10 (427)

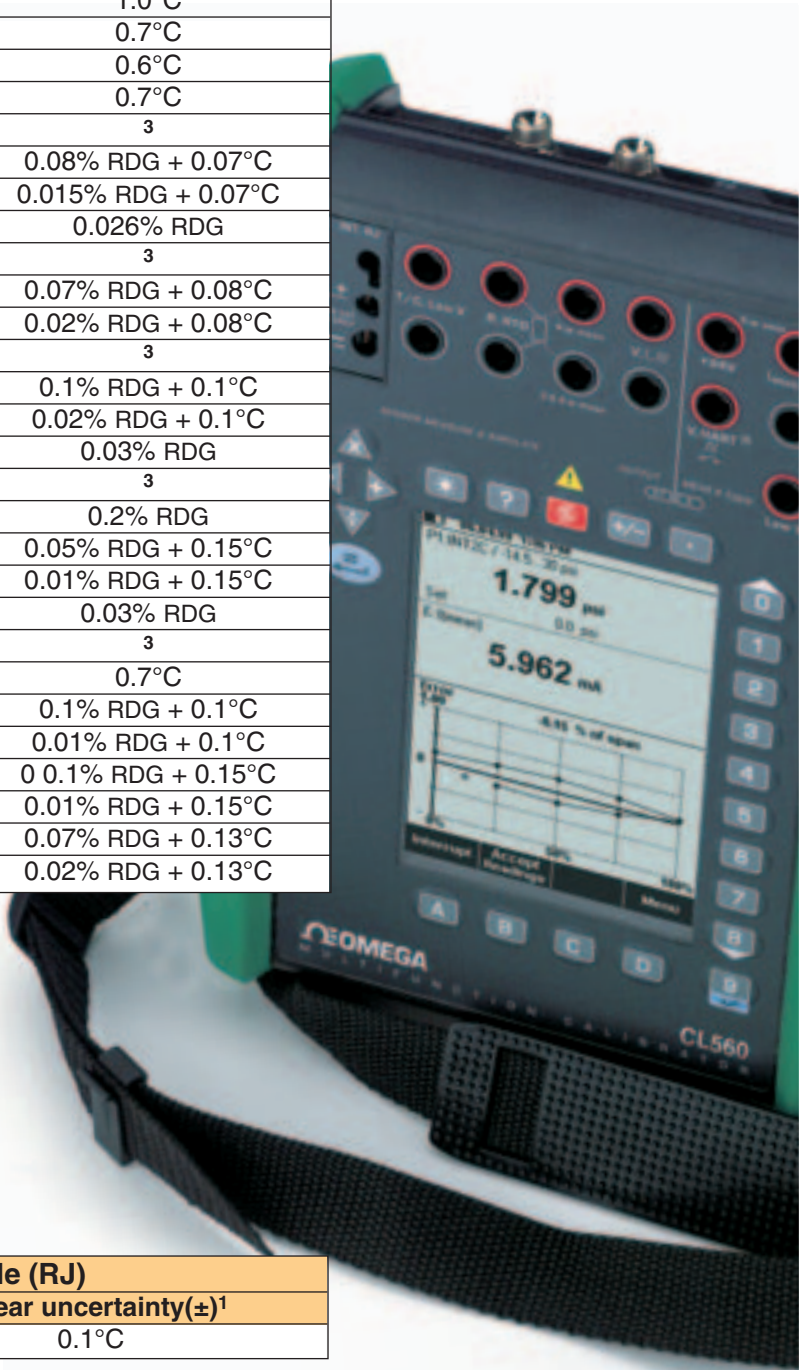
RTD/ohm simulation excitation current 0.2 ... 5 mA (1 ... 1000 ohm), 0.1 ... 1 mA (1 ... 4 kohm).



Thermocouple Measurement and Simulation			
Type	Range (°C)	Range (°C)	1 Year Uncertainty (±) ¹
B ²	0 to 1820	0 to 200	3
		200 to 500	2.0°C
		500 to 800	0.8°C
		800 to 1820	0.6°C
R ²	-50 to 1768	-50 to 0	1.0°C
		0 to 150	0.7°C
		150 to 1400	0.5°C
		1400 to 1768	0.6°C
S ²	-50 to 1768	-50 to 0	1.0°C
		0 to 50	0.7°C
		50 to 1500	0.6°C
		1500 to 1768	0.7°C
E ²	-270 to 1000	-270 to -200	3
		-200 to 0	0.08% RDG + 0.07°C
		0 to 600	0.015% RDG + 0.07°C
		600 to 1000	0.026% RDG
J ²	-210 to 1200	-210 to -200	3
		-200 to 0	0.07% RDG + 0.08°C
		0 to 1200	0.02% RDG + 0.08°C
K ²	-270 to 1372	-270 to -200	3
		-200 to 0	0.1% RDG + 0.1°C
		0 to 1000	0.02% RDG + 0.1°C
		1000 to 1372	0.03% RDG
N ²	-270 to 1300	-270 to -200	3
		-200 to -100	0.2% RDG
		-100 to 0	0.05% RDG + 0.15°C
		0 to 750	0.01% RDG + 0.15°C
		750 to 1300	0.03% RDG
T ²	-270 to 400	-270 to -250	3
		-250 to -200	0.7°C
		-200 to 0	0.1% RDG + 0.1°C
		0 to 400	0.01% RDG + 0.1°C
U ⁴	-200 to 600	-200 to 0	0.1% RDG + 0.15°C
		0 to 600	0.01% RDG + 0.15°C
L ⁴	-200 to 900	-200 to 0	0.07% RDG + 0.13°C
		0 to 900	0.02% RDG + 0.13°C

Resolution 0.01°C.
 With internal reference junction (module RJ)
 add 0.1°C uncertainty.
 Thermocouple types C³ (ASTM E 988 - 96), G³
 (ASTM E 1751 - 95e1) and D³ (ASTM E 988 - 96)
 also available as standard.
 Also other thermocouple types available as option.
 1) Uncertainty includes reference standard uncertainty,
 hysteresis, nonlinearity, repeatability and typical long
 term stability for mentioned period. (k=2)
 2) IEC 584, NIST MN 175, BS 4937, ANSI MC96.1
 3) ±(0.02 % RDG + 4) μV
 4) DIN 43710

Reference Junction Module (RJ)	
Ambient temperature range	1 Year uncertainty(±) ¹
-10 to 50°C	0.1°C



Multifunction Calibrator (cont'd)



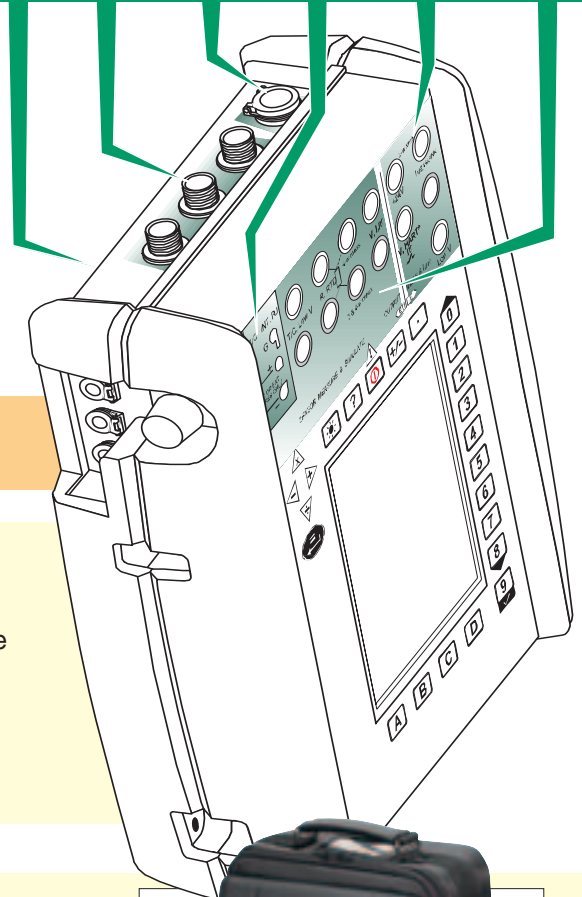
GENERAL SPECIFICATIONS

CL561 is a calibrator that grows with the needs of the user. CL561 can be used as a simple precision pressure indicator and still easily be upgraded into a multifunction pressure temperature-electrical calibrator.

CL561 Communication Ports

The three connectors at the side of the CL561 are for the environmental temperature sensor, external portable printer/PC communication and serial communication with external devices. The connector at the top of the CL561 is for external pressure modules. All the connectors are Lemo brand.

Basic Unit (BU)	Internal Pressure Modules (INT)	External Pressure Modules (EXT)	Reference Junction Module (RJ)	Electrical Module (E)	Electrical and Temperature Module (ET)
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Optional Accessories

CL561 is supported by a large number of accessories such as:

Datalogging Option

Multi-channel datalogging is a factory or field installable option. It allows for simultaneous logging of measurements from several different channels stored in memory with a time stamp. These results can be viewed in numerical or graphic form via the included PC software.

Maximum Number of Measurements: 70,000 readings

Min/Max Logging Interval: 1 to 3600 sec

Max Logging Time: 720 hours (30 days)

Carrying Case (Soft)

The carrying case is made of durable, water and stain resistant fabric. It provides room for test leads, pressure tubing, fittings and pressure hand pumps. The CL561 fits within the internal padded compartment which includes room for the CL561 User Guide.



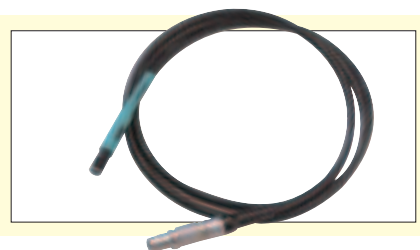
Dry Battery Cartridge

Complete with the necessary six 1.5V alkaline AA batteries, this accessory is a useful backup to the NiMH rechargeable battery pack provided as standard. The dry battery cartridge provides 2-5 hours of operation while allowing the use of line power when desired.



Environmental Temperature Sensor

Ideal for use in situations where the documenting of environmental temperature conditions during the calibration is required. The sensor is encased in rugged plastic at the end of a 1 m (3') length flexible cable which easily connects to the CL562 communication port dedicated for this purpose.





CL560 MULTIFUNCTION CALIBRATOR FACTS

General / Physical

- Multifunction Calibrator in one box
- Modular construction
 - pressure calibrator
 - temperature calibrator
 - multifunction calibrator
- Internal pressure modules
- External pressure modules
- IP65 water / dust proof casing
- Membrane protected keypad
- Integrated impact protectors
- Expansion capabilities

User Interface

- Graphical display of calibration results
- Back-lit LCD display
- Variable back-lit intensity
- Menu driven user interface
- Multilingual
- On-line help

Miscellaneous

- Hart® communication (optional)
- Portable printer connection
- Program version updates through RS-port

Pressure

- Integral relief valve (modules up to INT6C)
- Multimode pressure modules (vac/gauge/abs)
- Supports more than 30 different pressure units as standard
- P/P transmitter calibration

Temperature / Electrical

- Galvanically isolated input and output sections
- Electrical measurement / source: mA, mV, V, ohm, Hz
- Pulse generating and counting
- Many different RTD types as standard
- Many different T/C types as standard
- Special temperature sensors
- High accuracy internal cold junction compensation
- Simultaneous mA source and measurement

Usability

- Field entry of data and text
- Automatic storage of ambient/UUT temperature
- Datalogging, multiple channels
- Resolution setting
- Filter setting (damping)
- Ramp and step generation

CL561 Specifications

General

Display: 96 x 72 mm (3.78" x 2.83"), 320 x 240 pixels, backlit LCD

Weight: 1.7 - 2.3 kg (3.7 - 5.1 lb)

Dimensions: 245 D x 192 W x 74 mm H (9.6 x 7.5 x 2.9")

Case Protection: IP65 (dust and water proof)

Keyboard: Membrane protected individual keys

Battery Type: Rechargeable NiMH, 4000 mAh, 7.2V DC (included)

Battery Operation: Average 10 hours

Charger Supply: 100-240 Vac, 50 to 60 Hz

Operating Temperature: -10 to 50°C (14 to 122°F)

Specifications Valid: 15 to 35°C (59 to 95°F)

Temperature Coefficient: < ±0.001% RDG/°C outside of 15 to 35°C (59 to 95°F)

Storage Temperature: -20 to 60°C (-4 to 140°F)

Humidity: 0 to 80% R.H. non condensing

Measurement Sample Rate: 2.5 / second

Warranty for CL561: 3 years as standard, battery pack 1 year

NOTE: All specifications are subject to change without prior notice.



Multifunction Calibrator (cont'd)



MOST POPULAR MODEL HIGHLIGHTED!

To Order (Specify Model No.)		
Model No.*	Price	Description
CL561	\$3300	Multifunction calibrator, includes electrical module
CL562	4400	Multifunction calibrator, includes electrical and temperature modules

* Up to three pressure modules may be ordered/installed as suffixes to the base unit. Insert range code for internal pressure module or option code from tables below or leave blank for none.

Pressure Modules (Order as suffix or separately)

Internal (Order up to 3 max.) Include Code as Suffix to Model No.	External (Requires CL560-EXT-CAB)	Pressure Range	Price
-INT400MC	-	± 400mBar	\$1800
-INT2C	-	-1 to 2 Bar	1800
-INT6C	-	-1 to 6 Bar	1800
-INT20C	-	-1 to 20 Bar	1800
-INT60	-	0 to 60 Bar	2200
-BP	-	Barometric sensor	1200
-	CL560-EXT160	0 to 160 Bar	2400
-	CL560-EXT250	0 to 250 Bar	2400
-	CL560-EXT600	0 to 600 Bar	2400

Each unit comes supplied with rechargeable NiMH battery pack, test leads and clips, RS232 cable, battery charger, carrying strap, manual, NIST certificate and pressure hose set (only if unit is equipped with INT pressure modules).

Ordering Examples: CL562-INT2C-INT20C-BP is a multifunction calibrator with -1 to 2 Bar and -1 to 20 Bar internal pressure modules and a barometric sensor, \$4400 + 1800 + 1800 + 1200 = **\$9200**. CL561-MD is a multifunction calibrator with electrical module and multi-channel datalogging, \$3300 + 550 = **\$3850**.

OCW-2, OMEGACARESM extends standard 3-year warranty to a total of 5 years, (\$250), \$4400 + 250 = **\$4650**.

Other Options (Can order separately or together)		
Order Suffix	Price	Description
-MD	\$550	Multi-channel datalogging
-HC	600	Hart [®] Communication

Accessories

Model No.	Price	Description
CL560-CASE	\$200	Soft carrying case
CL560-TS	125	Environmental temperature sensor
CL560-BATT	95	Dry battery cartridge
CL560-EXT-CAB	150	Cable for external pressure modules



Hart[®] is a registered trademark of Hart[®] Communication Foundation.



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CANADA

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GERMANY

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• Temperature

Calibrators, Connectors, General Test and Measurement Instruments, Glass Bulb Thermometers, Handheld Instruments for Temperature Measurement, Ice Point References, Indicating Labels, Crayons, Cements and Lacquers, Infrared Temperature Measurement Instruments, Recorders Relative Humidity Measurement Instruments, RTD Probes, Elements and Assemblies, Temperature & Process Meters, Timers and Counters, Temperature and Process Controllers and Power Switching Devices, Thermistor Elements, Probes and Assemblies, Thermocouples Thermowells and Head and Well Assemblies, Transmitters, Wire

• Flow and Level

Air Velocity Indicators, Doppler Flowmeters, Level Measurement, Magnetic Flowmeters, Mass Flowmeters, Pitot Tubes, Pumps, Rotameters, Turbine and Paddle Wheel Flowmeters, Ultrasonic Flowmeters, Valves, Variable Area Flowmeters, Vortex Shedding Flowmeters

• pH and Conductivity

Conductivity Instrumentation, Dissolved Oxygen Instrumentation, Environmental Instrumentation, pH Electrodes and Instruments, Water and Soil Analysis Instrumentation

• Data Acquisition

Auto-Dialers and Alarm Monitoring Systems, Communication Products and Converters, Data Acquisition and Analysis Software, Data Loggers Plug-in Cards, Signal Conditioners, USB, RS232, RS485 and Parallel Port Data Acquisition Systems, Wireless Transmitters and Receivers

• Pressure, Strain and Force

Displacement Transducers, Dynamic Measurement Force Sensors, Instrumentation for Pressure and Strain Measurements, Load Cells, Pressure Gauges, Pressure Reference Section, Pressure Switches, Pressure Transducers, Proximity Transducers, Regulators, Strain Gages, Torque Transducers, Valves

• Heaters

Band Heaters, Cartridge Heaters, Circulation Heaters, Comfort Heaters, Controllers, Meters and Switching Devices, Flexible Heaters, General Test and Measurement Instruments, Heater Hook-up Wire, Heating Cable Systems, Immersion Heaters, Process Air and Duct, Heaters, Radiant Heaters, Strip Heaters, Tubular Heaters