Thermo Scientific CM515 and HME900

Density Converter Electronics

Users of Thermo Scientific density meters or specific gravity analyzers are offered the choice of a HART® compatible, field-mounted density converter or a control room based unit, ensuring an optimum data processing solution. Both instruments provide high integrity calculations of density and density related variables which are critical for effective custody transfer and process optimization.









Features

- High accuracy calculations
- Choice of field or control room installation
- Flexible input into user DCS
- Extensive range of standard calculations
- Customer defined function (CDF) for non-standard calculation

Two Thermo Scientific density converter options are available that work in combination with Thermo Scientific liquid and gas density meters to ensure the optimum processing solution for the selected application. The Thermo Scientific HME900 head-mounted electronics option gives the user the power of control room electronics in the field with full HART compatibility. For applications requiring greater input/output flexibility or where the electronics are control room based, users may prefer the Thermo Scientific CM515 density converter.

The density converters accept the frequency and PT100 (RTD) temperature outputs from the density meter, together with a pressure input (if required), and calculate a selection of density and density derived parameters such as live density, specific gravity, molecular weight, 'Brix, 'Baume, 'API, and gas compressibility (depending on fluid type). The customer defined function (CDF) facility allows non-standard calculations to be performed, such as percent concentration, percent solids, percent alcohol and percent fat using a look-up table derived from customer supplied data.





Thermo Scientific HME900

The HME900 head-mounted density converter option may be included with any Thermo Scientific liquid or gas density meter or specific gravity analyzer. The head-mounted electronics unit conditions the output signal to give a HART compatible 4-20 mA signal that can be used for indication or can be connected directly to the user's DCS. Alternatively, the output can be read digitally by a HART compatible control or data collection system. The local display allows the process engineer to view the prime variable value either in engineering units alone or with an alternating display of percent of chosen span.

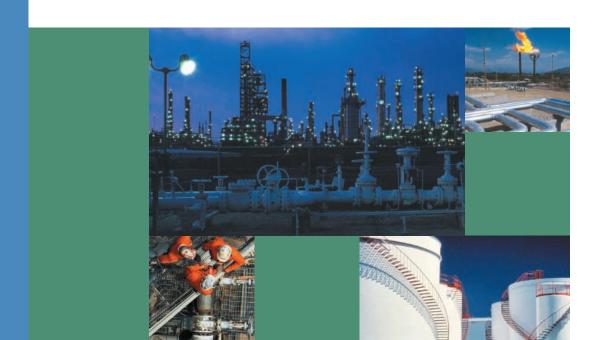
The selection of HME900 electronics is ideal in most general density measurement applications and is essential when HART communications are required. The Thermo Scientific density meter/HME900 system is certified for use in flammable atmospheres.

HME900 Ordering Information

The HME900 head-mounted electronics unit may only be specified as part of a Thermo Scientific density meter or specific gravity analyzer order by selecting the SIGNAL OUTPUT / 'H' option. It is also possible to select the WinHME900 communications software and modem package by selecting the OPTIONS / 'W' option.

HME900 Features

- Available on Thermo Scientific density meters/SG analyzers
- Field mounted, direct density output
- Gas density conversion based on general gas equations of state (Redlich-Kwong)
- Liquid calculation using ASTM D1250 (1980) for refined fluids and crude oils
- · High accuracy calculations
- Local display
- HART compatible
- Hazardous area approvals
- WinHME900 PC configuration program
- Device description (DD) available for Emerson 375 field communicator



Specifications

Thermo Scientific HME900

Dimensions /Weight Fits into the standard Thermo Scientific density meter terminal / amplifier enclosure						
Add digit 7, 8mm (0.3 in 17-segment LCD display;	Physical Specifications					
Resolution D.1% or 0.01% depending on display variable						
Cable	Local Display (Optional)		• •			
Environmental Rating						
Ambient Hemperature Range Ambient Hemdelty Up to 65% non-condensing Data Storage Connections Communications Communications Usas HART Communication (process) Handheld communication (process) Handheld communication (process) Handheld (process)						
Ambient Humidity Up to 95% non-condensing Connections Configurations estimps and data retained in e² non-volatile storage Connections Screw terminals suitable for wire sizes to 1.5 mm² (0.06 in²) Usas HART communication WintMY500 PC configuration program, Handheld communicator (e.g. Emerson 375 Field Communicator) Power Without pressure option: two loops 24 V 23 mA With pressure option: moskimum three loops 24 V 23 mA With pressure option: maximum three loops 24 V 23 mA With pressure option: maximum three loops 24 V 23 mA Functional Specifications Inputs Functional Specifications Inputs Temperature (PT100 RTD) Bange: 200°C to +200°C (-328°F to 932°F); Resolution: better than 0.0015%; Accuracy at +20°C (+688°F) reference: ±0.1°C (±0.18°F), -200°C to +200°C (-328°F to +332°F) ±1.05°C (±0.08°F) typical, -200°C to +200°C (-328°F to +332°F) ±1.05°C (±0.08°F) typical, -200°C to +200°C (-328°F to +332°F) ±1.05°C (±0.08°F) typical, -200°C to +200°C (-328°F to +332°F) ±1.05°C (±0.08°F) typical, -200°C to +200°C (-328°F to +322°F) ±1.05°C (±0.08°F) typical, -200°C to +200°C (-38°F) to +322°F) ±1.05°C (±0.08°F) typical, -200°C to +200°C (-38°F to +322°F) ±1.05°C (±0.08°F) typical, -200°C to +200°C (-38°F to +322°F) ±1.05°C (±0.08°F) typical, -200°C to +300°C (+48°F to +122°F) ±1.05°C (±0.08°F) typical, -200°C to +300°C (+48°F to +122°F) ±1.05°C (±0.08°F) typical, -200°C to +500°C (+48°F to +122°F) ±1.05°C (±0.08°F) typical, -200°C to +500°C (+48°F to +122°F) ±1.05°C (±0.08°F) typical, -200°C to +500°C (+48°F to +122°F) ±1.08°C (±0.08°F) typical, -200°C to +500°C (+48°F to +122°F) ±1.08°C (±0.08°F) typical, -200°C to +500°C (+48°F to +122°F) ±1.08°C (±0.08°F) typical, -200°C to +500°C (+48°F to +122°F) ±1.08°C (±0.08°F) typical, -200°C to +500°C (+48°F to +122°F) ±1.08°C (±0.08°F) typical, -200°C to +500°C (+48°F to +122°F) ±1.08°C (±0.08°F) typical, -200°C to +500°C (+48°F to +122°F) ±1.08°C (±0.08°F) typical, -200°C to +500°C (+48°F to +120°F) ±1.08°C (±0.08°F) typical, -200°C to +500°C (+48°F to +120°F) ±1.08°C (±0.0						
Data Sturage Connections Screw terminals suitable for wire sizes to 1.5 mm² (0.06 in²) Communications Uses NART communications protocol; WinHME900 PC configuration program; Handheld communication (a) terminal series and 1.5 mm² (0.06 in²) Power Without pressure option: two loops 24 V 23 mA; With pressure option: two loops 24 V 23 mA Functional Specifications Inputs Temperature (PT100 RTD) Range: -200°C to +200°C (-328°F to 392°F); Resolution: better than 0.0015%; Accuracy at +20°C (-468°F) reference: ±0.1°C (±0.18°F); -200°C to +400°C (-328°F to 392°F). Resolution: better than 0.0015%; Accuracy at +20°C (-468°F) reference: ±0.1°C (±0.08°F); 0°C to +200°C (-428°F to +392°F). Pressure (4-20mA) Resolution: better than 0.015%; Accuracy at 20°C (68°F) reference: better than 0.1% point. 20°C to +50°C (-47°F to +122°F): ±0.05°C (±0.09°F) typical, ±0.01°C (±0.018°F) max Period (current pulse 6-18mA) Resolution: botter than 0.01%; Accuracy at 20°C (68°F) reference: better than 0.1% point. 20°C to +50°C (-47°F to +122°F): ±0.0% typical, ±0.01°C (±0.018°F) max Period (current pulse 6-18mA) Range: 10° not \$20°D µs (100 Nt to 40000 Hz); Resolution: 24° ns. Accuracy at reference +20°C (+88°F): as resolution; Drift: ±0°C to +50°C (-47°F to +122°F): ±0.0% typical; ±50 ppm max Outputs 4.20 mA HART Operating voltage: 8-28 VDC at terminals; Resolution: 0.015% span; Accuracy at reference +20°C (+88°F): ±0.1% of point; Drift: ±0°C to +50°C (-47°F to +122°F): ±0.08% full scale typical; Drift: ±0°C to +50°C (-47°F to +122°F): ±0.08% full scale typical; ±50 ppm max Operating voltage: 8-28 VDC at terminals; Current: modulated at density meter frequency 6-18 mA Accuracy at reference +20°C (-47°F to +122°F): ±0.08% full scale typical; ±0.175% full scale max Local Display Selection of engineering units only, or engineering units and percent full switching every 5 seconds Other Input/ Output Density Supply Operating voltage: ±10-28 VDC at terminals; Current: modulated at density meter frequency 6-18 mA Accuracy 1.05% point Range:	Ambient Temperature Range	-20°C to + 60°C (-4°F to +140°F)				
Communications Uses HART Communications protocol; WinHME900 PC configuration program; Handheld communicator (e.g. Emerson 375 Field Communicator)	,					
See HART communications protocol; WinHME900 PC configuration program; Handheld communicator (e.g. Emerson 375 Field Communicator)						
Without pressure option: two loaps 24 V 23 mA						
Handheld communicator (e.g. Emerson 375 Field Communicator)	Communications	Uses HART communications protocol;				
Fower Without pressure option: two loops 24 V 23 mA		WinHME900 PC configuration program;				
Functional Specifications						
Imputs	Power					
Inputs		With pressure option: maximum three loops 24 V 23 mA				
Resolution: better than 0.0015%; Accuracy at ±20°C (±68°F) reference: ±0.1°C (±0.18°F); ±200°C to ±200°C (±328°F to ±329°F); ±100°C to ±200°C (±42°F to ±329°F); ±100°C to ±200°C (±42°F to ±329°F); ±100°C to ±200°C (±42°F to ±329°F); ±100°C (±0.018°F) max Pressure (4.20mA) Resolution: better than 0.1%; ±100°C (±0.018°F) max Period (current pulse 6-18mA) Resolution: better than 0.1%; ±100°C (±0.018°F) max Period (current pulse 6-18mA) Resolution: better than 0.1%; bytical, ±0.2% max Period (current pulse 6-18mA) Range: 10 ms to 250 µs (100 Hz to 4000 Hz); Resolution: ±2 ns; Accuracy at reference ±20°C (±68°F): as resolution; Drift ±20°C to ±50°C (±4°F to ±122°F): ±25 ppm typical; ±50 ppm max Accuracy at reference ±20°C (±68°F): as resolution; Drift ±20°C to ±50°C (±6°F to ±122°F): ±25 ppm typical; ±50 ppm max Accuracy at reference ±20°C (±68°F): ±25 ppm typical; ±50 ppm max Accuracy at reference ±20°C (±68°F): ±25 ppm typical; ±50 ppm max Accuracy at tenderone ±20°C (±68°F): ±25 ppm typical; ±50 ppm max Accuracy at tenderone ±20°C (±68°F): ±25 ppm typical; ±50 ppm max Accuracy at tenderone ±20°C (±68°F): ±25 ppm typical; ±50 ppm max Accuracy at tenderone ±20°C (±68°F): ±0.08% full scale typical; ±0.175% full scale max Accuracy at tenderone ±20°C (±68°F): ±0.08% full scale typical; ±0.175% full scale max Accuracy at tenderone ±20°C (±68°F): ±0.08% full scale typical; ±0.175% full scale max Accuracy at tenderone ±20°C (±68°F): ±0.08% full scale typical; ±0.175% full scale max Accuracy at tenderone ±20°C (±68°F): ±0.08% full scale typical; ±0.175% full scale max Accuracy at tenderone ±20°C (±68°F): ±0.08% full scale typical; ±0.175% full scale max Accuracy at tenderone ±20°C (±68°F): ±0.08% full scale typical; ±0.175% full scale max Accuracy at tenderone ±20°C (±68°F): ±0.08% full scale typical; ±0.08% fu	Functional Specifications					
Accuracy at +20°C (+48°F) reference: ±0.1°C (±0.18°F); -200°C to +200°C (+32°F to +392°F) ±0.05°C (±0.09°F); 0°C to +200°C (+42°F to +132°F); ±0.05°C (±0.09°F); 0°C to +200°C (+42°F to +122°F); ±0.05°C (±0.09°F) typical, ±0.01°C (±0.018°F) max Perssure (4-20mA)	Inputs	Temperature (PT100 RTD)	Range: -200°C to +200°C (-328°F to 392°F);			
-200°C to +200°C (-320°F to +392°F);	•	•	Resolution: better than 0.0015%;			
-200°C to +200°C (-320°F to +392°F);			Accuracy at +20°C (+68°F) reference: ±0.1°C (±0.18°F):			
D°C to +20°C to +50°C (-4°F to +122°F); ±0.05°C (±0.09°F) typical, ±0.01°C (±0.018°F) max						
Drift 20°C to +50°C (-4°F to +122°F): ±0.05°C (±0.018°F) typical, ±0.01°C (±0.018°F) max Pressure (4-20mA)						
Heading Head			, , , , , , , , , , , , , , , , , , , ,			
Pressure (4-20mA) Resolution: better than 0.01%; Accuracy at 20°C (68°F) reference: better than 0.1% point; Drift -20°C to -60°C (-45° to -122°F); ±0.1% typical, ±0.2% max						
Accuracy at 20°C (68°F) reference: better than 0.1% point; Drift 20°C to +50°C (49°F to +122°F); ±0.1% typical, ±0.2% max		Proseuro (4.20mA)				
Period (current pulse 6-18mA)		riessule (4-ZulliA)	,			
Period (current pulse 6-18mA) Range: 10 ms to 250 µs (100 Hz to 4000 Hz); Standard range: 2500 µs (400 Hz to 4000 Hz); Resolution: ±2 ns; Accuracy at reference +20°C (+68°F): as resolution; Drift -20°C to +50°C (-40°F to +122°F): ±25 ppm typical; ±50 ppm max						
Standard range: 2500 µs to 250 µs (400 Hz to 4000 Hz); Resolution: ±2 ns; Accuracy at reference +20°C (+68°F); as resolution; Drift -20°C to +50°C (-4°F to +122°F); ±25 ppm typical; ±50 ppm max Dutputs		D : 1/				
Resolution: ±2 ns; Accuracy at reference +20°C (+68°F): as resolution; Drift -20°C to +50°C (-4°F to +122°F): ±25 ppm typical; ±50 ppm max Outputs 4-20 mA HART Operating voltages: 9-28 VDC at terminals; Resolution: 0.015% span; Accuracy at reference +20°C (+68°F): ±0.1% of point; Drift -20°C to +50°C (-4°F to +122°F): ±0.08% full scale typical; ±0.175% full scale max Local Display Selection of engineering units only, or engineering units and percent fure switching every 5 seconds Other Input/ Output Density Supply Operating voltage: 10-28 VDC at terminals; Current: modulated at density meter frequency 6−18 mA Enclosure Temperature (PCB mounted 100 ohm PRT) Range: -40°C to +80°C (-40°F to +176°F); Alarm points: -20°C to +60°C (-4°F to +140°F) Compliance Quality Assurance Us0 9001:2000 Et Mark Compliant Electromagnetic Compatibility (ENG1326:1997) Low Voltage Directive Compliant Safe Area Use As standard ATEX Conformance: Ex Il 1 G EEx ia Il CT 4 (-20°C ≤ T _{amb} ≤ to +60°C) Intrinsically Safe (94/9/EC) ATEX Conformance: Sarasota FD910 / Sarasota FD950 / Sarasota FD960 only: Ex Il 2 G EEx d Il CT 4 (T _{amb} = -20°C to +60°C) or T₃ (T _{amb} = -20°C to +180°C responded in the perature of +115°C or +180°C responded in the perature of +115°C		Period (current pulse 6-18MA)				
Accuracy at reference +20°C (+68°F): as resolution; Drift -20°C to +50°C (-48°F to +122°F): ±25 ppm typical; ±50 ppm max Outputs 4-20 mA HART Operating voltage: 8-28 VDC at terminals; Resolution: 0.015% span; Accuracy at reference +20°C (+68°F): ±0.1% of point; Drift -20°C to +50°C (-49°F to +122°F): ±0.08% full scale typical; ±0.175% full scale max Local Display Selection of engineering units only, or engineering units and percent fusion of engineering units only, or engineering units and percent fusion of engineering units only, or engineering units and percent fusion of engineering units only, or engineering units and percent fusion of engineering units only, or engineering units and percent fusion of engineering units only, or engineering units and percent fusion of engineering units only, or engineering units and percent fusion of engineering units only, or engineering units and percent fusion of engineering units only, or engineering units and percent fusion of engineering units only, or engineering units and percent fusion of engineering units only, or engineering units and percent fusion the function of engineering units only, or engineering units and percent fusion function of engineering units only, or engineering units and percent fusion every 5 seconds Operating every 5 seconds Operating every 5 seconds Operating overy 5 seconds						
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Outputs 4-20 mA HART Operating voltage: 8-28 VDC at terminals; Resolution: 0.015% span; Accuracy at reference +20°C (+68°F): ±0.1% of point; Drift -20°C to +50°C (-4°F to +122°F): ±0.08% full scale typical; ±0.175% full scale max Local Display Selection of engineering units only, or engineering units and percent fur switching every 5 seconds Other Input/ Output Density Supply Density Supply Density Supply Operating voltage: 10-28 VDC at terminals; Current: modulated at density meter frequency 6–18 mA Accuracy: ±0.5% point; Range: -40°C to +80°C (-40°F to +176°F); Alarm points: -20°C to +60°C (-40°F to +140°F) Compliance Quality Assurance ISO 9001-2000 CE Mark Compliant Electromagnetic Compatibility (EN61326:1997) Low Voltage Directive As standard ATEX Conformance: Ex II 1 G EEx ia IIC T₄ (-20°C ≤ T _{amb} ≤ to +60°C) Intrinsically Safe (94/9/EC) ATEX Conformance: Sarasota FD910 / Sarasota FD950 / Sarasota FD960 only: Ex II 2 G EEx d IIC T₄ (T _{amb} = -20°C to +80°C) or T₃ (T _{amb} = -20°C Temperature classification of T₄ or T₃ for use with maximum process fluid temperature of +115°C or +180°C respication of T₃ or use with maximum process fluid temperature of +115°C or +180°C respication of Calibration Certificates supplied as standard.						
Resolution: 0.015% span; Accuracy at reference 420°C (+68°F): ±0.1% of point; Drift -20°C to +50°C (-4°F to +122°F): ±0.08% full scale typical; ±0.175% full scale max Local Display Selection of engineering units only, or engineering units and percent fur switching every 5 seconds Other Input/ Output Density Supply Operating voltage: 10-28 VDC at terminals; Current: modulated at density meter frequency 6–18 mA Enclosure Temperature (PCB mounted 100 ohm PRT) Range: -40°C to +80°C (-40°F to +176°F); Alarm points: -20°C to +60°C (-4°F to +140°F) Compliance Quality Assurance Uso 9001:2000 CE Mark Compliant Electromagnetic Compatibility (EN61326:1997) Low Voltage Directive Compliant Safe Area Use As standard ATEX Conformance: Intrinsically Safe (94/9/EC) ATEX Conformance: Sarasota FD910 / Sarasota FD950 / Sarasota FD960 only: Ex II 2 G EEx d IIC T₄ (Tamb = -20°C to +60°C) or T₃ (Tamb = -20°C Canadian Standards Association (CSA): Class I Div 1 Groups B, C and D Flameproof Calibration Certification Calibration traceable to national standards. Calibration certificates supplied as standard.						
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Drift -20°C to +50°C (-4°F to +122°F): ±0.08% full scale typical; ±0.175% full scale max Local Display Selection of engineering units only, or engineering units and percent fursivitching every 5 seconds Other Input/ Output Density Supply Operating voltage: 10-28 VDC at terminals; Current: modulated at density meter frequency 6–18 mA Enclosure Temperature (PCB mounted 100 ohm PRT) Range: -40°C to +80°C (-40°F to +176°F); Alarm points: -20°C to +60°C (-4°F to +140°F) Compliance Quality Assurance ISO 9001:2000 E Mark Compliant Electromagnetic Compatibility Compliant Electromagnetic Compatibility Compliant ENGAGE:1997) Low Voltage Directive Compliant Safe Area Use As standard ATEX Conformance: Ex Il 1 G EEx ia IIC T4 (-20°C ≤ T _{amb} ≤ to +60°C) Intrinsically Safe (94/9/EC) ATEX Conformance: Sarasota FD910 / Sarasota FD950 / Sarasota FD960 only: Ex II 2 G EEx d IIC T4 (T _{amb} = -20°C to +60°C) or T3 (T _{amb} = -20°C Tamb ≤ 10°C to +60°C) Class I Div 1 Groups B, C and D Flameproof Clais I Div 1 Groups B, C and D Elibration Certification Calibration certificates supplied as standard.						
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Local Display Selection of engineering units only, or engineering units and percent furth switching every 5 seconds			Drift -20°C to +50°C (-4°F to +122°F): $\pm 0.08\%$ full scale typical;			
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$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			Current: modulated at density meter frequency 6–18 mA			
Alarm points: -20°C to +60°C (-4°F to +140°F)ComplianceUso 9001:2000CE MarkCompliantElectromagnetic CompatibilityCompliant(EN61326:1997)CompliantLow Voltage DirectiveCompliantSafe Area UseAs standardATEX Conformance:Ex II 1 G EEx ia IIC T_4 (-20°C ≤ T_{amb} ≤ to +60°C)Intrinsically Safe (94/9/EC)Ex II 2 G EEx d IIC T_4 (T_{amb} = -20°C to +60°C) or T_3 (T_{amb} = -20°C for +180°C respective of (94/9/EC)Canadian Standards Association (CSA):Class I Div 1 Groups B, C and DFlameproofCalibration CertificationCalibration traceable to national standards. Calibration certificates supplied as standard.		Enclosure Temperature	Accuracy: ±0.5% point;			
Compliance Quality Assurance ISO 9001:2000 CE Mark Compliant Electromagnetic Compatibility Compliant (EN61326:1997) Compliant Low Voltage Directive Compliant Safe Area Use As standard ATEX Conformance: Ex II 1 G EEx ia IIC T ₄ (-20°C ≤ T _{amb} ≤ to +60°C) Intrinsically Safe (94/9/EC) Ex II 2 G EEx d IIC T ₄ (T _{amb} = -20°C to +60°C) or T ₃ (T _{amb} = -20°C to +60°C) or T ₃ (T _{amb} = -20°C to +60°C) or T ₃ (T _{amb} = -20°C to +180°C respondian Standards Association (CSA): Canadian Standards Association (CSA): Class I Div 1 Groups B, C and D Flameproof Calibration Certification Calibration traceable to national standards. Calibration certificates supplied as standard.		(PCB mounted 100 ohm PRT)	Range: -40° C to $+80^{\circ}$ C (-40° F to $+176^{\circ}$ F);			
Compliance Quality Assurance ISO 9001:2000 CE Mark Compliant Electromagnetic Compatibility Compliant (EN61326:1997) Compliant Low Voltage Directive Compliant Safe Area Use As standard ATEX Conformance: Ex II 1 G EEx ia IIC T ₄ (-20°C ≤ T _{amb} ≤ to +60°C) Intrinsically Safe (94/9/EC) Ex II 2 G EEx d IIC T ₄ (T _{amb} = -20°C to +60°C) or T ₃ (T _{amb} = -20°C to +60°C) or T ₃ (T _{amb} = -20°C to +60°C) or T ₃ (T _{amb} = -20°C to +180°C respondian Standards Association (CSA): Canadian Standards Association (CSA): Class I Div 1 Groups B, C and D Flameproof Calibration Certification Calibration traceable to national standards. Calibration certificates supplied as standard.			Alarm points: -20°C to +60°C (-4°F to +140°F)			
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Electromagnetic Compatibility Compliant (EN61326:1997) Low Voltage Directive Compliant Safe Area Use As standard ATEX Conformance: Ex II 1 G EEx ia IIC T_4 (-20°C $\leq T_{amb} \leq$ to +60°C) Intrinsically Safe (94/9/EC) ATEX Conformance: Sarasota FD910 / Sarasota FD950 / Sarasota FD960 only: Ex II 2 G EEx d IIC T_4 ($T_{amb} = -20^{\circ}$ C to +60°C) or T_3 ($T_{amb} = -20^{\circ}$ C Flameproof (94/9/EC) Temperature classification of T_4 or T_3 for use with maximum process fluid temperature of +115°C or +180°C responsible Temperature of Class I Div 1 Groups B, C and D Flameproof Calibration Certification Calibration traceable to national standards. Calibration certificates supplied as standard.						
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Canadian Standards Association (CSA): Class I Div 1 Groups B, C and D Flameproof Calibration Certification Calibration traceable to national standards. Calibration certificates supplied as standard.						
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Calibration Certification Calibration traceable to national standards. Calibration certificates supplied as standard.	, ,	Class I Div 1 Groups B, C and D				
		0.111				
Optional traceable calibration equipment listing available	Calibration Certification		· ·			
1 1 1 1 1 3 3 3 1 1 1 1 1 1 1 1 1 1 1 1		Uptional traceable calibration equipment listing available				



Thermo Scientific CM515

Designed to accept inputs from a Thermo Scientific density meter, the CM515 density converter offers a pressure input that allows a variety of density related variables to be calculated while the customer defined function (CDF) table allows a two dimensional look-up table to be entered, enabling variables with specific relationships to density and another variable to be estimated. The user input allows an external variable to be connected to the CDF and an output related to the external variable to be generated. Standard equations are used to calculate density related variables, including density at reference conditions, specific gravity, process gravity and molecular weight.

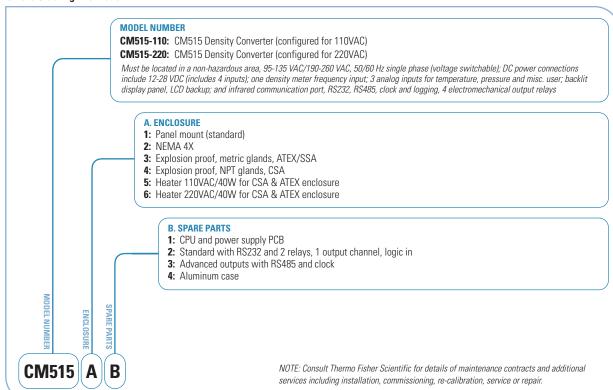
The backlit LCD display offers a wide viewing angle that ensures clear visibility in the field or control room with the front panel indicating the current input, output and some intermediate calculated values. Data transmission from the CM515 can be via alarm contacts, 4-20 mA loops or bi-directional serial communications (RS232 or RS485). The CM515 density converter is best suited to applications that require a greater level of input/output flexibility than offered

by the Thermo Scientific HME900 electronics and when HART compatibility is not required.

CM515 Features

- Pulse input suitable for all Thermo Scientific density meters and SG analyzers
- Temperature and pressure inputs for density conversion to reference conditions
- Liquid density conversion based on ASTM D1250-04 for crude oils, lube oils and refined products
- Gas density conversion based on general gas equations of state (Ideal Gas, Redlich-Kwong, Soave-Redlich-Kwong, Peng-Robinson)
- Customer defined function (look-up table)
- Two 4-20 mA current loops
- RS-232, RS-485 and infrared serial ports
- ASCII Modbus, RTU Modbus and printer port protocols
- Backlit display for high visibility
- CSA and ATEX XP enclosures available

CM515 Ordering Information



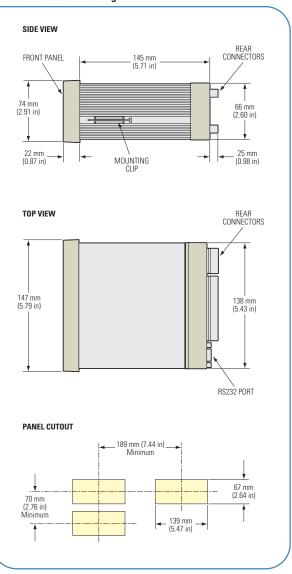
Available Calculations for Thermo Scientific Density Converter Electronics

	HM	HME900		CM515	
Measurements / Calculations Performed	Liquid	Gas	Liquid	Gas	
Temperature	•	•	•	•	
Pressure	•	•	•	•	
Line Density	•	•	•	•	
Reference Density (density at reference temperature and pressure)	•	•	•	•	
Specific Gravity (SG) / Relative Density	•	•	•	•	
°Brix	•	_	•	_	
°Baume	•	_	•	_	
°API	•	_	•	_	
%solids	Via CDF	_	Via CDF	_	
%alcohol	Via CDF	_	Via CDF	_	
%fat	Via CDF	_	Via CDF	_	
%mass	•	_	•	_	
%volume	•	_	•	_	
Molecular Weight (MW)	_	•	_	•	
Gas Compressibility (Redlich-Kwong)	_	•	_	•	
Liquid Density (Soave-Redlich-Kwong, Peng-Robinson)	_	_	•	_	
Estimated Calorific Value (CV)	_	Via CDF	_	Via CDF	
Estimated Wobbe Index	_	Via CDF	_	Via CDF	

CM515 Basic Terminal Designation Legend

		mai I	Designation Legend		
Te	erminal Label		Designation	Comment	
1 F	1 FINP		Frequency Input 1+ (liquid)	Density input	
· ·			Pulse Input 1+ (gas)	(Pulse for liquid)	
3 8	SG	-	Signal ground		
5 E	EXC V	2+	Excitation Term 2+	For AINP1 RTD input	
7	AINP1	+	Analog input ch 1 (+)	Temperature input	
8 ′	-111 I	-	Analog input ch 1 (–)		
9 /	AINP2	+	Analog input ch 2 (+)	Pressure input	
10 ′	AIIVI Z	-	Analog input ch 2 (–)		
11	AINP3	+	Analog input ch 3 (+)	User input	
12 ′	AIIVI 3	-	Analog input ch 3 (–)		
15 \	/o	+	8-24 volts DC output	Overload protected	
16 0	G –		DC ground		
17 \	Vi +		DC power input	DC power in 12-28 V	
18 5	SH E		Shield terminal		
19			RS485 (+)		
20 F	RS485	-	RS485 (–)		
21		G	RS485 ground		
22	1+		Switch 1		
23		2+	Switch 2		
24 I	NPUT LOGICS	3+	Switch 3		
25		4+	Switch 4		
26		C-	Signal ground		
27	OUT 1	+	Output ch 1 (+)		
28	JU1 1	-	Output ch 1 (–)		
29	OUT 2		Output ch 2 (+)	Optional output	
30			Output ch 2 (–)	Орионаі ошриі	
31			Relay common		
32			Relay 1		
33 F	RELAYS	R2	Relay 2		
34	R3 R4		Relay 3	Ontional valous	
35			Relay 4	Optional relays	
Е	N AC MAINS N		Mains ground		
N A			Mains neutral	AC power in 95-135 V or 190-260 V	
Α			Mains active		
RS	S232 port		9-pin serial port		

CM515 Dimensional Drawing



Thermo Scientific CM515

DI 1 10 10 1				
Physical Specifications	147 174 167 15	Oir v O Oir v C Oir Maidely v hairles v danal)		
CM515 Unit Dimensions		8 in x 2.9 in x 6.6 in) (width x height x depth)		
Net Weight	Typically 2.7 kg (6 lb)			
Display		ic display and 11-character alphanumeric display; update rate of 0.3 seconds		
Environmental Rating	IP65 (NEMA 4X) when panel m			
Ambient Temperature Range		c) conformal coating; +5°C to +40°C (+41°F to +104°F)		
Ambient Humidity	Up to 95% non-condensing			
Data Storage		a retained in non-volatile storage		
Communications		orts standard; RS485; 2400 to 19200 baud rate; protocols: ASCII, Modbus RTU, printer		
Power	95-135 VAC; 190-260 VAC; 12-2	28 VDC		
Functional Specifications				
Frequency Input	Range	0 kHz to 10 kHz		
	Overvoltage	30 V maximum		
	Update Time	0.3 sec		
	Cutoff Frequency	Programmable		
	Configuration	Pulse, coil or NPS input		
Analog Input	Overcurrent	100 mA absolute maximum rating		
	Update Time	<1.0 sec		
	Configuration	4-wire RTD, 4-20 mA, 0-5 V and 1-5 V input		
	Non-linearity	Up to 20 correction points (flow inputs)		
	RTD Input	Sensor type: PT100 & PT500 to IEC 75; Connection: four-wire;		
	TITE IIIput	Range: -200°C to +350°C (-328°C to +662°F); Accuracy: 0.1°C typical		
	4-20 mA Input	Impedance: 100 Ohms (to common signal ground);		
	4-20 MA Mput	Accuracy: 0.05% full scale (+20°C), 0.1% (full temperature range, typical)		
	0-5 or 1-5 Volts Input	Impedance: 10 MOhms (to common signal ground);		
	0-5 of 1-5 voits input	Accuracy: 0.05% full scale (+20°C), 0.1% (full temperature range, typical)		
Logio Inputo	Cignal Time	CMOS, TTL, open collector, reed switch		
Logic Inputs	Signal Type Overvoltage	30 V maximum		
D-1 Ott				
Relay Output	Number of Outputs	2 relays plus 2 optional relays		
	Voltage	250 volts AC, 30 volts DC maximum (solid state relays use AC only)		
	Current	3 A maximum		
Transducer Supply	Voltage	8 to 24 volts DC, programmable		
	Current	70 mA @ 24 V, 120 mA @ 12 V maximum		
	Protection	Power limited output		
Isolated Output	Number of Outputs	1 configurable output (plus 1 optional)		
	Configuration	Pulse/digital or 4-20 mA output		
	Pulse/Digital Output	Signal type: open collector; Switching: 200 mA, 30 volts DC maximum;		
		Saturation: 0.8 volts maximum		
	4-20 mA Output	Supply: 9 to 30 volts DC external; Resolution: 0.05% full scale;		
		Accuracy: 0.05% full scale (+20°C), 0.1% (full temperature range, typical)		
Compliance				
Quality Assurance	ISO 9001:2000			
CE Mark	Compliant			
Electromagnetic Compatibility	Compliant			
(EN61326:1997)				
Low Voltage Directive	Compliant			
Approvals		oved enclosures available for hazardous areas		
πρρισναίδ	ALEA, FIN, GOA and GAA approved enclosures available for flazardous areas			

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