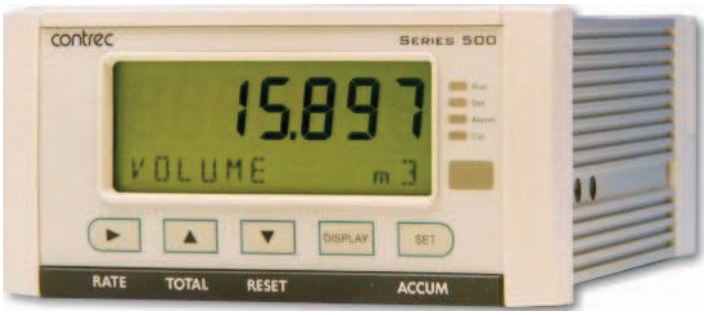
SERIES 500

FLOW COMPUTER

Model 515

STEAM FLOW
NATURAL GAS FLOW
PROCESS CONTROL
and MORE.



Features

- Two configurable frequency inputs
- Four configurable analog inputs
- Four logic inputs
- Selectable protocols on serial ports including Modbus RTU
- Infra-red communications port on front panel
- Isolated 4-20 mA outputs for retransmission
- Isolated pulse outputs for retransmission
- Pulse width and scaling of pulse output
- Up to four relay outputs
- Real Time Clock logging and printer output
- Front panel adjustment of 8-24 V DC output voltage
- Backlit display
- LCD backup

CE

The model 515 is a flow computer with full rate-totalizing functions suitable for complex applications such as Natural Gas, Steam and Process Control.

General Overview

The 515 is the advanced model in the 500 series. It has more inputs and outputs of higher accuracy giving it greater capabilities and configurability to suit a wide range of applications.

There are multiple frequency and analog inputs which make it suitable for applications that require extra external sensors for temperature, pressure, density, level devices and so on.

The Model 515 is capable of operating in a wide temperature range and its “plug and play” option card makes enhancements easy without reprogramming. The behaviour of the instrument is determined by the instrument software which is selected from an increasing list of applications in the 500 Series Program Manager.

A snap-in front panel strip with front key functions is available to suit the particular type of application, such as rate totalising or batch controlling.

Accuracy • Quality • Performance

Software Configuration

The instrument can be further tailored to suit specific application needs including units of measurement, custom tags, second language or access levels. A distributor can configure these requirements before delivery.

Instrument parameters including units of measurement can be programmed in the field, according to the user-access levels assigned to parameters by the distributor.

All set-up parameters, totals and logged data are stored in non-volatile memory with at least 30 years retention.

Displayed Outputs

The front panel display shows the current values of the input variables and the results of the calculations.

The instrument can be supplied with a real-time clock for data logging of over 1000 entries of the variables as displayed on the main menu.

Communications

There are three communication ports available as follows:

- RS-232 serial port (standard)
- RS-485 port (advanced option)
- Infra-red port (on front panel)

These ports are available for remote meter reading, printer connection and for initial application loading of the instrument.

Isolated Outputs

The opto-isolated outputs can retransmit any main menu variable. The type of output is determined by the nature of the assigned variable. Totals are output as pulses and rates are output as 4-20 mA signals. One output is standard, a second output is available as an option.

Relay Outputs

The relays can be used for general alarms or specific functions such as valve and pump control. Alarm relays can be assigned to any of the main menu variables of a rate type. The alarm can be fully configured including hysteresis. Two relays are standard with an additional two available in the advanced option.

Terminal Designations

Terminal Label			Designation	Comment
1	FINP	1+	Frequency Input 1+	
2	FINP	2+	Frequency Input 2+	
3	SG	-	Signal ground	
4	EXC V	1+	Excitation Term 1+	
5	EXC V	2+	Excitation Term 2+	For AINP1 RTD input
6	EXC V	3+	Excitation Term 3+	For AINP2 RTD input
7	AINP1	+	Analog input ch 1 (+)	
8		-	Analog input ch 1 (-)	
9	AINP2	+	Analog input ch 2 (+)	
10		-	Analog input ch 2 (-)	
11	AINP3	+	Analog input ch 3 (+)	
12		-	Analog input ch 3 (-)	
13	AINP4	+	Analog input ch 4 (+)	
14		-	Analog input ch 4 (-)	
15	Vo	+	8-24 volts DC output	Overload protected
16	G	-	DC Ground	
17	Vi	+	DC power input	DC power in 12-28V
18	SH	E	Shield terminal	
19	RS485	+	RS485 data in (+)	Advanced option
20		-	RS485 data out (-)	
21		G	RS485 ground	
22	LOGIC INPUTS	1+	Switch 1	
23		2+	Switch 2	
24		3+	Switch 3	
25		4+	Switch 4	
26		C-	Signal ground	
27	OUT 1	+	Output ch 1 (+)	
28		-	Output ch 1 (-)	
29	OUT 2	+	Output ch 2 (+)	Advanced option
30		-	Output ch 2 (-)	
31	RELAYS	RC	Relay common	
32		R1	Relay 1	
33		R2	Relay 2	
34		R3	Relay 3	Advanced option
35		R4	Relay 4	
E	AC MAINS	E	Mains ground	AC power in 95-135V or 190-260V
N		N	Mains neutral	
A		A	Mains active	
RS232 port			9-pin serial port	

Specifications

General

Operating Environment

PCB Protection - Conformal Coating	
Temperature	-20°C to +60°C
Humidity	0 to 95% non condensing
PCB Protection - None	
Temperature	+5°C to +40°C
Humidity	5% to 85% non condensing
Power Supply	95 to 135 volts AC or 190 to 260 volts AC or 12 to 28 volts DC
Power Cons.	Typically 6W
Protection	Sealed to IP65 (Nema 4X) when panel mounted
Dimensions	147mm (5.8") width 74mm (2.9") height 166mm (6.6") depth
Keypad	5 embossed tactile keys

Display

Type	LCD with 7-digit numeric display and 11-character alphanumeric display
Digits	15.5mm (0.6") high
Characters	6mm (0.24") high
LCD Backup	Last data visible for 15min after power down
Update Rate	0.3 second

Approvals

Interference	CE compliance
Enclosure	ATEX, FM, CSA and SAA approved enclosures available for hazardous areas

Inputs

Frequency Input (General)

Number of inputs	2 configurable inputs
Range	0 to 10kHz
Overvoltage	30V maximum
Update Time	0.3 sec
Cutoff frequency	Programmable
Configuration	Pulse, coil or NPS input
Non-linearity	Up to 10 correction points

Pulse

Signal Type	CMOS, TTL, open collector, reed switch
Threshold	1.3 volts

Coil

Signal Type	Turbine and sine wave
Sensitivity	15mV p-p minimum

NPS

Signal Type	NPS sensor to Namur standard

Logic Inputs

Signal Type	CMOS, TTL, open collector, reed switch
Number of inputs	4 inputs

Analog Input (General)

Number of inputs	4 configurable inputs
Overcurrent	100mA absolute maximum rating
Update Time	< 1.0 sec
Configuration	4-20mA, 0-5V, 1-5V (AINP1 to AINP4) RTD (AINP1 and AINP2 only)
Non-linearity	Up to 20 correction points (flow inputs only)

RTD Input (AINP1 and AINP2 only)

Sensor Type	PT100 & PT500 to IEC 751
Connection	Four Wire
Range	-100°C to 300°C
Accuracy	0.1°C typical

4-20mA Input (AINP1 to AINP4)

Impedance	100ohms (to common signal ground)
Accuracy	0.05% full scale (20°C) 0.1% (full temperature range, typical)

0-5 or 1-5Volts Input (AINP1 to AINP4)

Impedance	10Mohms (to common signal ground)
Accuracy	0.05% full scale (20°C) 0.1% (full temperature range, typical)

Outputs

Relay Output

No. of Outputs	2 relays plus 2 optional relays
Voltage	250 volts AC, 30 volts DC maximum (solid state relays use AC only)
Current	3A maximum

Communication Ports

Ports	RS-232 port RS-485 port (optional) Infra-red port
Baud Rate	2400 to 19200 baud
Parity	Odd, even or none
Stop Bits	1 or 2
Protocols	ASCII, Modbus RTU, Printer (RS232)

Transducer Supply

Voltage	8 to 24 volts DC, programmable
Current	70mA @ 24V DC, 120mA @ 12V DC max
Protection	Power limited output

Isolated Output

No. of Outputs	1 configurable output (plus 1 optional)
Configuration	Pulse or 4-20mA output

Pulse Output

Signal Type	Open collector
Switching	200mA, 30 volts DC maximum
Saturation	0.8 volts maximum
Width	Programmable: 10, 20, 50, 100, 200 or 500ms

4-20mA 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)

Real Time Clock (Optional)

Battery Type	3 volts Lithium button cell (CR2032)
Battery Life	5 years (typical)

Important: Specifications are subject to change without notice.

Product Codes

Model	Supplementary Code							Description
515 .						-		
Enclosure	1							Panel mount enclosure
	2							Field mount enclosure (not yet available)
	3/5							Explosion proof Ex410 with metric glands (5 specifies heater version)
	4/6							Explosion proof Ex410 with NPT glands (6 specifies heater version)
Output Options		0						4 logic inputs, 1 isolated output, 2 relays (only relay type 1 is available), RS232 (DB9) communication port
		1						4 logic inputs, 2 isolated outputs, 4 relays, real-time clock data logging, RS232 (DB9) and RS485 communication ports
		2/3						4 logic inputs, 2 isolated outputs, 4 relays, real-time clock data logging, RS232 (DB9) and Ethernet/RF communication ports (not yet available)
Relay Type			1					2 electromechanical relays only
			2					2 electromechanical and 2 solid state relays
			3					Solid state relays only (not yet available)
Power Supply				E				For 220/240 VAC
				A				For 110/120 VAC
				D				For DC power only 12-28 VDC
Display Panel Option					F			Fully optioned (with backlight, LCD backup and Infra-Red comms port)
PCB Protection						C		**Conformal coating** - required for maximum environmental operating range. Recommended to avoid damage from moisture and corrosion.
						N		**None** - suitable for IEC standard 654-1 Climatic Conditions up to Class B2 (Heated and/or cooled enclosed locations)
Application Pack Number							XXnn	Defines the application software to be loaded into the instrument

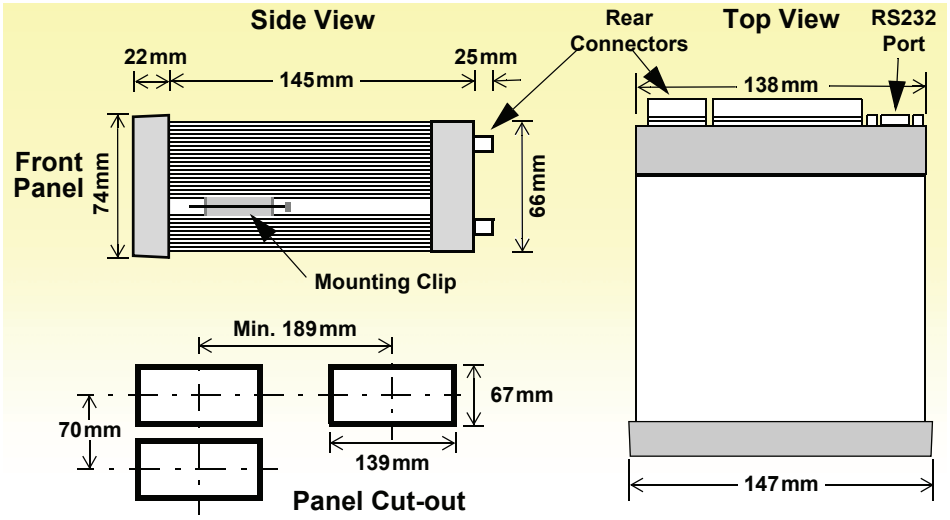
Example full product part number is 515.111EFC-XXnn (This is the number used for placing orders).

Part Number

515.XXXXXX-XXnn
see Product Code to select required features

Default Application software:
515-XXnn-000000

Dimension Drawings



Available 500 Series Applications

This table contains the applications available across both the 515 and 505 models. For further details on a listed application, please request or refer to the application pack brief by model and pack number. i.e. 515-CR01.
A similar application list with PDF datasheets is available on the website. _____

Pack No.	Description	Comments	Model Type	NEW
BATCH	**Batch Controllers**		**515/505**	
BC01	Dual Stage Batch - Volumetric Frequency Flow		505	
BC02	Dual Stage Batch - Volumetric Analog Flow		505	
BC03	Dual Stage Batch - Mass Frequency Flow		505	
BC04	Dual Stage Batch - Mass Analog Flow		505	
BS01	Secure Batch Controller- Volumetric Frequency Flow	ID-Tag Interface	515	*NEW*
	Batch/Flow Controllers			
BF01	Dual Stage Batch & Flow Control - Volumetric Frequency Flow	PI Flow Control	515	
BF02	Dual Stage Batch & Flow Control - Volumetric Analog Flow	PI Flow Control	515	
BF03	Dual Stage Batch & Flow Control - Mass Frequency Flow	PI Flow Control	515	
BF04	Dual Stage Batch & Flow Control - Mass Analog Flow	PI Flow Control	515	
BR01	Dual Stage Batch & Ratio Control - Volumetric Frequency Flow	PI Flow Control	515	
BR02	Dual Stage Batch & Ratio Control - Volumetric Analog Flow	PI Flow Control	515	
BR03	Dual Stage Batch & Ratio Control - Mass Frequency Flow	PI Flow Control	515	
BR04	Dual Stage Batch & Ratio Control - Mass Analog Flow	PI Flow Control	515	
CONTROL	**Control Computers**			
CR01	Blending/ratio - Volumetric Frequency Flow, Analog Control	PI Flow Control	515	
CR02	Blending/ratio - Volumetric Analog Flow, Analog Control	PI Flow Control	515	
CB01	Batch Based Blending - Volumetric Frequency Flow, DCV Control	Control for Digital Valves	515	
FLOW	**Flow Computers**			
FA01	Add or Subtract Flow - 2 Input, Freq or Analog (Volumetric)	Flow1 +/- Flow2	515	
FA02	Add or Subtract Flow - 2 Input, Freq or Analog (Mass)	Flow1 +/- Flow2	515	
FA03	Add or Subtract Flow - 2 Input, Freq or Analog (Energy)	Flow1 +/- Flow2	515	
FC01	Single Channel - Volumetric Frequency Flow		505	
FC02	Single Channel - Volumetric Analog Flow		505	
FC03	Single Channel - Mass Frequency Flow		505	
FC04	Single Channel - Mass Analog Flow		505	
FG01	Generic Flow - Frequency Flow, Analog Input	Multifunctional Analog Input	505	*NEW*
FO01	Open Channel - Frequency Velocity, Analog Level	Flow = Velocity x Area	505	
FP01	Petroleum Consumption - 2 Channel Frequency Flow	ASTM D1250, Flow1 - Flow2	515	
FP02	Petroleum Consumption - 2 Channel Analog Flow	ASTM D1250, Flow1 - Flow2	515	
FP03	Petroleum Flow - Quadrature Input, Temperature Correction	ASTM D1250, ISO 6551, LPG	515	
FN01	Net Oil (Water Cut) - Mass Frequency Flow	ASTM D1250-04	515	
PP01	Pressurised Petroleum Flow - Quadrature Input	ASTM D1250-04, ISO 6551	515	

Pack No.	Description	Comments	Model Type	NEW
GAS	**General Gas Computers**		**515/505**	
GC01	General Gas - Single or Quadrature Frequency Flow	Ideal & General Equations	515	
GC02	General Gas - Analog Flow	Ideal & General Equations	515	
GC03	General Gas - Stacked DP Mass Flowmeter	Ideal & General Equations	515	
GC04	General Gas - Stacked DP Meter (ISO 5167/Cones)	Ideal & General Equations	515	
GC06	General Gas - Stacked DP Volumetric Flowmeter	Ideal & General Equations	515	
	Natural Gas Computers			
GN01	Natural Gas (AGA-8) - Single or Quadrature Frequency Flow		515	
GN02	Natural Gas (AGA-8) - Analog Flow		515	
GN03	Natural Gas (AGA-8) - Stacked DP Mass Flowmeter		515	
GN04	Natural Gas (AGA-8) - Stacked DP Meter (ISO 5167/Cones)		515	
GN05	Natural Gas (AGA-8) - Stacked DP Meter (AGA-3)		515	
GN06	Natural Gas (AGA-8) - Stacked DP Volumetric Flowmeter		515	
GN11	Natural Gas (SGERG) - Single or Quadrature Frequency Flow		515	
GN12	Natural Gas (SGERG) - Analog Flow		515	
GN13	Natural Gas (SGERG) - Stacked DP Mass Flowmeter		515	
GN14	Natural Gas (SGERG) - Stacked DP Meter (ISO 5167/Cones)		515	
GN16	Natural Gas (SGERG) - Stacked DP Volumetric Flowmeter		515	
HEAT	**Heat/Energy Computers**			
HC01	Heat/energy Calculator - Volumetric Frequency Flow	Water & other fluids	515	
HC02	Heat/energy Calculator - Volumetric Analog Flow	Water & other fluids	515	
HC03	Heat/energy Calculator - DP Meter (Mass Span)	Water & other fluids	515	
HC04	Heat/Energy Calculator - DP Meter (ISO 5167/Cones)	Water (IAPWS-IF97)	515	
HC06	Heat/Energy Calculator - DP Meter (Volumetric Span)	Water & other fluids	515	
HC12	Heat/energy Calculator - Mass Analog Flow	Water & other fluids	515	
LEVEL	**Level Monitors**			
LM01	Single Tank Level Monitor - Analog level	With strapping table	505	
STEAM	**Steam Computers**			
SC01	Steam Computer - Volumetric Frequency Flow	IAPWS-IF97	515	
SC02	Steam Computer - Volumetric Analog Flow	IAPWS-IF97	515	
SC03	Steam Computer - DP Meter (Mass Span)	IAPWS-IF97	515	
SC04	Steam Computer - DP Meter (ISO 5167/Cones)	IAPWS-IF97	515	
SC05	Steam Computer - DP Meter (AGA-3)	IAPWS-IF97	515	
SC06	Steam Computer - DP Meter (Volumetric Span)	IAPWS-IF97	515	
OTHER	**Other Applications**			
MP01	Mass Flow - Frequency Input With Master Proving	API Manual, Chapter 4.5	515	