

MULTI-FUNCTION FLOW COMPUTERS

Series 500 - Model 505



The model 505 is a flow computer with full rate totalizing and batch controlling functions suitable for a wide range of flowmeters and Process Control.

General Overview

The 505 is the base model in the 500 Series. With one configurable frequency input and one 4-20mA analog input, it is a cost-effective instrument for simple applications.

The hardware is very adaptable and when fully optioned has all the new features that come with the 500 series and its powerful micro-controller including data logging and infra-red communications.

The Model 505 is capable of being used in a number of application areas including batch controlling, rate totalising and level monitoring. 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.

Terminal Designations

Terminal Label	Designation	Comment	
1	RS485 +	RS485 (+)	
2	RS485 -	RS485 (-)	
3	G	Comms ground	
4	RS232 Tx	RS232 data out	
5	RS232 Rx	RS232 data in	
6	C	CTS (Clear to send)	
7	Io +	4-20mA Output	Advanced option
8	SG -	Signal Ground 0v	
9	Li +	Logic input	
10	D OUT 1+	Open collector o/p 1	Digital outputs
11	D OUT 2+	Open collector o/p 2	
12	li +	4-20mA input	
13	SG -	Signal Ground 0v	
14	Fi +	Frequency input	
15	Vo +	8-24 volts DC output	Overload protected
16	G -	DC Ground	DC power in 12-28V
17	Vi +	DC power input	
18	SH E	Shield terminal	
19	RELAYS R1	Relay 1	
20	RELAYS RC	Relay Common	
21	RELAYS R2	Relay 2	
E	AC MAINS E	Mains ground	AC power in 95-135V or 190-260V
N	AC MAINS N	Mains neutral	
A	AC MAINS A	Mains active	
RS232 port		9-pin serial port	

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 Output

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 up to 100 entries of the variables as displayed on the main menu.

Communications

There are three communication port available as follows:

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

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

Retransmission & Control Outputs

The instrument can retransmit any main-menu variable. The digital outputs can retransmit totals as pulses or operate as logic levels for control outputs. If the instrument has the advanced option. It outputs rates as a 4-20mA signal.

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.



MULTIFUNCTION FLOW COMPUTER

Specifications Model 505

General

Operating Environment

PCB Protection - Conformal Coating	
Temperature	0°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
Protections	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 (optional)
Update Rate	0.3 second

Approvals

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

Input

Frequency Input (General)

Range	0 to 10kHz
Overvoltage	30V maximum
Update Time	0.3 sec
Cutoff frequency	Programmable (default at 0.25Hz)
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
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Analog Input (4-20mA)

Impedance	250 ohms (to common signal ground)
Accuracy	0.1% typical full scale (20°C) 0.2% (fully temperature range)
Non-linearity	Up to 20 correction points (flow inputs only)

Logic Input

Signal Type	CMOS, TTL, open collector, reed switch
Number of inputs	1 input

Output

Relay Output

No. of Outputs	2 relays
Voltage	250 volts AC, 30 volts DC maximum
Current	3A maximum

Communication Ports

Ports	RS-232 port RS-485 port Infra-red port (optional)
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

Pulse Output

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

4-20mA Output

Supply	24 volts DC internal, non-isolated
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

MULTIFUNCTION FLOW COMPUTER

Series 500 - Model 505

Part Number

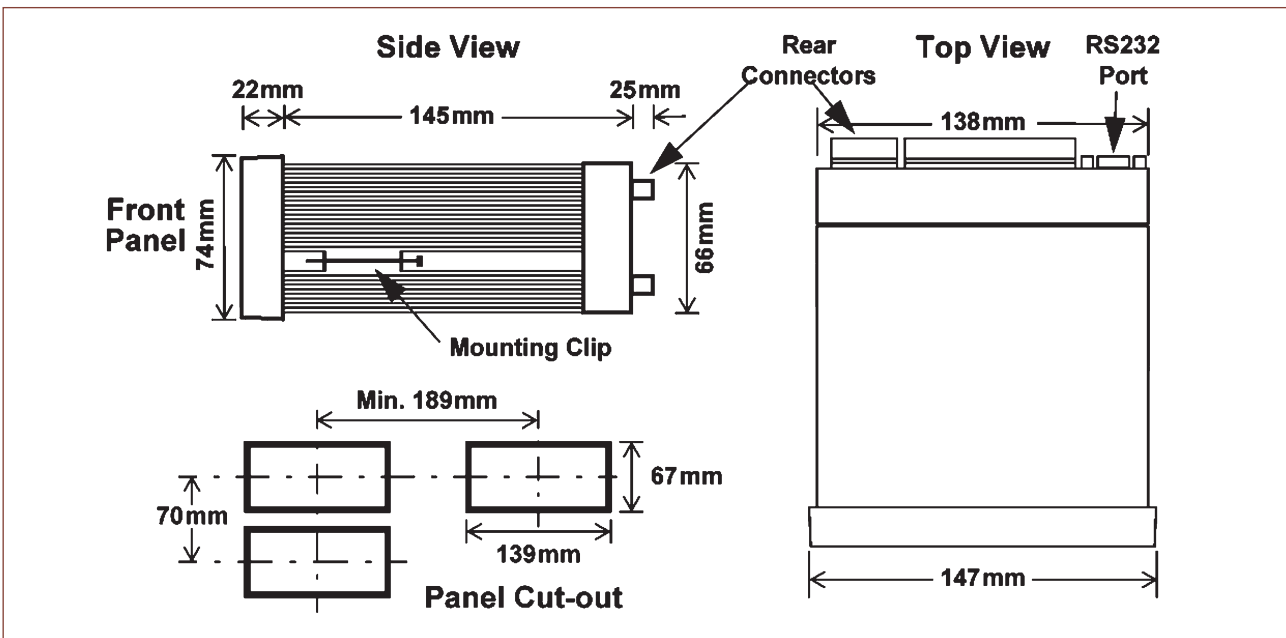
505-XXXXXX-XXnn (see Product Code to select required features)
 Default Application software: 505-XXnn-000000

Product Codes

Model	Supplementary Code	Description
505	-	
Enclosure	1	Panel mount enclosure
	2	Filed mount enclosure (not yet available)
	3	Explosion proof Ex410 with metric glands (5 specifies heater version)
	4	Explosion proof Ex410 with NPT glands (6 specifies heater version)
Output Options	0	Basic - RS232 and RS485 serial ports, 2 relays, 2 pulse outputs, rear key input
	1	Advanced - also includes 4-20mA o/p and Real-time clock for printer output and logging (100 logs)
Extra Supply	2	9 way DB connector for RS232 serial port
Power Supply	E	For 220/240 VAC
	A	For 110/120 VAC
	D	For DC power only 12-28 VDC
Display Panel Options	S	Standard (no backlight, LCD backup or Infra-Red comms port)
	F	Fully optioned (with backlight, LCD backup and Infra-Fed 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)
Applicationh Pack Number	XXnn	Defines the application software to be loaded into the instrument
For example: Model No. 505.112EFC Displayed on the 500 Series as: (only h/w that affects the operation is represented)		- 1 - - F - 505 MODEL

Example full product part number is 505.112EFC-XXnn (This is the number used for placing orders).

Dimension Drawings



MULTIFUNCTION FLOW COMPUTER

Series 500 - Model 515



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 behavior of the instrument is

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

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 totalizing or batch controlling.

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 Output

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 up to 100 entries of the variables as displayed on the main menu.

Communications

There are three communication port 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 4-20mA signals. One output is standard, a second output is available as on 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+
6	EXC V 3+	Excitation Term 3+
		For AINP1 RTD input
		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
16	G -	DC Ground
17	Vi +	DC power input
18	SH E	Shield terminal
		Overload protected
		DC power in 12-28V
19	RS485 +	RS485 data in (+)
20	-	RS485 data in (-)
21	G	RS485 ground
		Advanced option
22	LOGIC 1+	Switch 1
23	INPUTS 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 (+)
30	-	Output ch 2 (-)
		Advanced option
31	RELAYS RC	Relay common
32	R1	Relay 1
33	R2	Relay 2
34	R3	Relay 3
35	R4	Relay 4
		Advanced option
E	AC	E Mains ground
N	MAINS	N Mains neutral
A		A Mains active
		AC power in 95-135V or 190-260V
RS232 port		9-pin serial port

MULTIFUNCTION FLOW COMPUTER

Specifications Model 515

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
Protections	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

Input

Frequency Input (General)

Number of inputs	2 configurable inputs
Range	0 to 10kHz
Overvoltage	30V maximum
Update Time	0.3 sec
Cutoff frequency	Programmable (default at 0.25Hz)
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
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Logic Input

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

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 to IEC 751
Connection	Four Wire
Range	-100°C to 300°C
Accuracy	0.1°C typical

4-20mA Input (AINP1 to AINP4)

Impedance	100 ohms (to common signal ground)
Accuracy	0.05% full scale (20°C) 0.1% (fully 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)

Output

Relay Output

No. of Outputs	2 relay plus 2 optional relays
Voltage	250 volts AC, 30 volts DC maximum
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 internal
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



MULTIFUNCTION FLOW COMPUTER

Series 500 - Model 515

Part Number

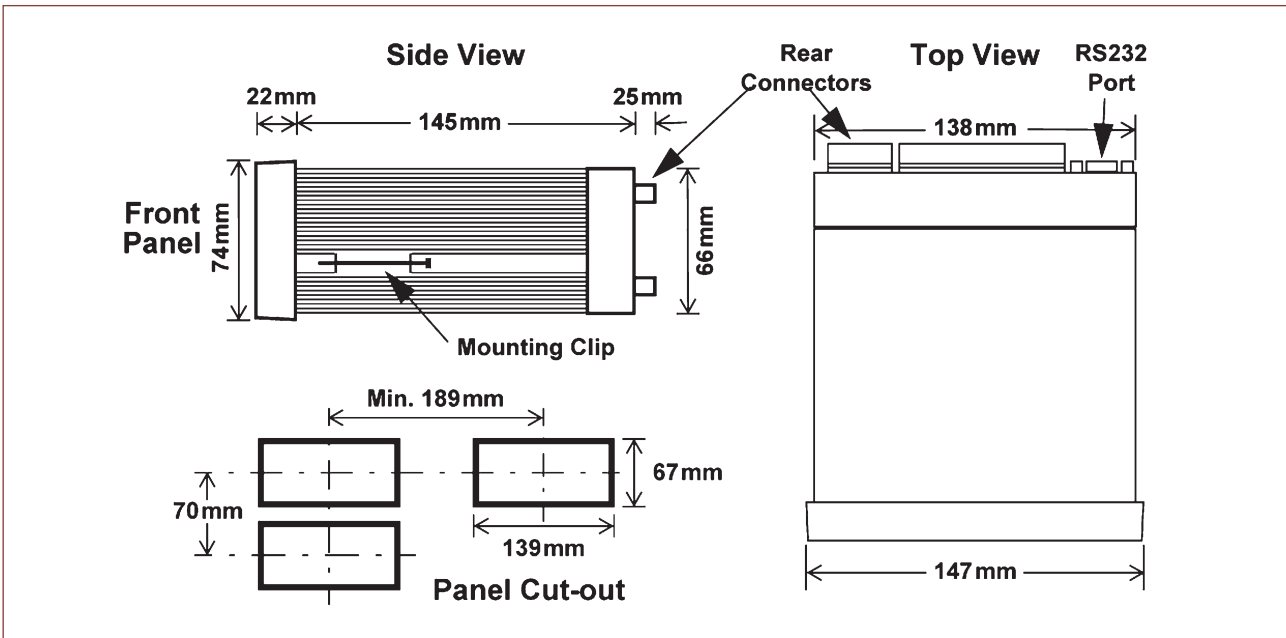
515-XXXXXX-XXnn (see Product Code to select required features)
 Default Application software: 515-XXnn-000000

Product Codes

Model	Supplementary Code	Description
515	-	
Enclosure	1	Panel mount enclosure
	2	Filed mount enclosure (not yet available)
	3	Explosion proof Ex410 with metric glands (5 specifies heater version)
	4	Explosion proof Ex410 with NPT glands (6 specifies heater version)
Output Options	0	Basic - 9 way DB RS232 serial ports, 2 relays, 1 isolated 4-20 or pulse output and 4 logic inputs
	1	Advanced - also includes RS485 port, 2 extra relays 1 isolated 4-20 or pulse output and 4 logic inputs
CPU Type	0	Original - no ASCII or printer protocol, basic logging (100 logs)
	1	Standard - ASCII and printer protocol, extra logging (1000+ logs)
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-Fed 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
For example: Model No. 515.111EFC Displayed on the 500 Series as: (only h/w that affects the operation is represented)		- 11 - F - 515 MODEL

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

Dimension Drawings



TEST & MEASUREMENTS

Field Totalisers, Controllers & Indicators



MULTIFUNCTION FLOW COMPUTER

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.

Pack No.	Description	Application Class	Comments	Model Type	NEW
BATCH	Batch Controllers	Class 01		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	
	Batch / Flow Controllers	Class 03			
BF01	Dual Stage Batch & Flow Control - Volumetric Frequency Flow		PI Control	515	NEW
BF02	Dual Stage Batch & Flow Control - Volumetric Analog Flow		PI Control	515	NEW
BF03	Dual Stage Batch & Flow Control - Mass Frequency Flow		PI Control	515	NEW
BF04	Dual Stage Batch & Flow Control - Mass Analog Flow		PI Control	515	NEW
CONTROL	Control Computer	Class 02			
CR01	Blending / Ratio - Volumetric Frequency Flow, Analog Control		PI Control	515	
CR02	Blending / Ratio - Volumetric Analog Flow, Analog Control		PI Control	515	
FLOW	Flow Computer	Class 01			
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	
FO01	Open Channel - Frequency Velocity, Analog Level		Flow = Velocity x Area	505	
	Flow Computer	Class 02			
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	NEW
	Flow Computers	Class 03			
FN01	Net Oil (Water Cut) - Mass Frequency Flow		ASTM D1250-04	515	NEW
PP01	Pressurised Petroleum Flow - Quadrature Input		ASTM D1250-04, ISO 6551	515	
GAS	Gas Computers	Class 02			
GI01	Ideal Gas - Frequency Flow			515	
GI02	Ideal Gas - Analog Flow			515	
GI03	Ideal Gas - Stacked DP Mass Flowmeter			515	
GI06	Ideal Gas - Stacked DP Volumetric Flowmeter			515	
GAS	Gas Computer	Class 03		515/505	
GN01	Natural Gas (AGA-8) - 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 Mater (ISO 5167/Cones)			515	
GN05	Natural Gas (AGA-8) - Stacked DP Mater (AGA-3)			515	
GN06	Natural Gas (AGA-8) - Stacked DP Volumetric Flowmeter			515	
GN11	Natural Gas (SGERG) - 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 Mass (ISO 5167/Cones)			515	
GN16	Natural Gas (SGERG) - Stacked DP Volumetric Flowmeter			515	
HEAT	Heat / Energy Computer	Class 02			
HC01	Heat / Energy Calculation - Volumetric Frequency Flow		Water & other fluids	515	NEW
HC02	Heat / Energy Calculation - Volumetric Analog Flow		Water & other fluids	515	NEW
HC04	Heat / Energy Calculation - DP Meter (ISO 5167/Cones)		Water (IAPWA-IF97)	515	NEW
HC06	Heat / Energy Calculation - DP Meter (Volumetric Span)		Water & other fluids	515	NEW
LEVEL	Level Monitors	Class 01			
LM01	Single Tank Level Monitor - Analog level		With Strapping table	505	
STEAM	Steam Computers	Class 02			
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	Class 03			
MP01	Mass Flow - Frequency Input With Master Proving		API Manual, Chapter 4.5	515	

