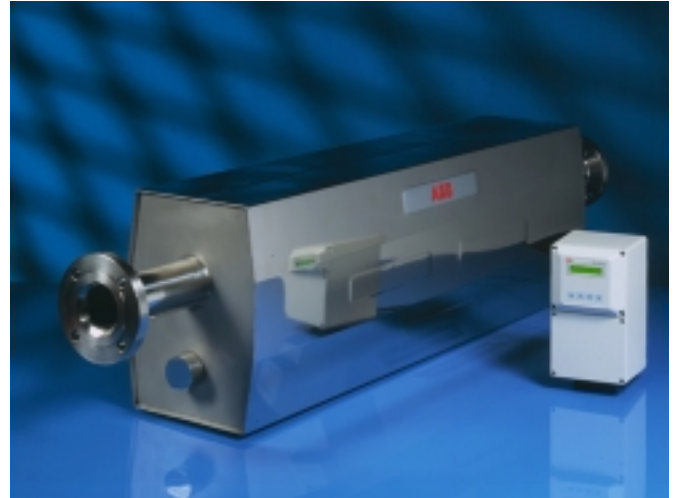# MassMeter

Coriolis Flow Measurement

Specification DataFile

- ■ **Remote diagnostics**
  - – allows trained ABB engineers to communicate with your meter by telephone, giving instant diagnostic help or service

- ■ **Remote multiple advanced control features**
  - – gives total flexibility and system capability to the measuring instrument – all included as standard

- ■ **Wide range of sizes 1mm to 100mm**
  - – widest range of applications can be covered. Flow rates from 0.25kg/min to 600 tons/hour

- ■ **World wide hazardous area approvals**
  - – all applications in hazardous plants may be covered either by the intrinsically safe or explosion-proof versions now available

- ■ **Manufactured in ISO 9001 quality environment**
  - – guarantee of product quality and attention to detail. In addition, all units are calibrated on nationally traceable calibration rigs

- ■ **Special food & beverage versions available**
  - – both construction methods and choice of end fittings render this one of the best sanitary (Hygienic) flowmeters available

- ■ **Choice of materials**
  - – suitable for specialized applications

CORIOLIS MASS FLOWMETER an accurate, reliable method of measuring the mass of your application fluids

ABB Instrumentation

The Smart Choice

ABB MassMeters set the standard in the industry for flow systems with built-in 'intelligence'. The ability of this flow system to both measure multiple variables and perform complex control/computing actions within the transmitter, sets it apart from its competitors, making it the best choice for the user to make.

MassMeter – Omega Fractional Sizes

Comprehensive Size Range

The very wide range of sizes offered by the ABB MassMeter covers both the large size end and the sub-miniature end of the market. This includes mass flow rates of greater than 10,000 kg/minute, as used in the petrochemical industry and mass flow rates down to less than 5 grammes/minute, as used in the food and pharmaceutical industry or anywhere using small volume high-value additives.

Comprehensive Features

The MassMeter has the widest possible range of features and user benefits built-in as standard:

'Super Smart' Capability

Fully programmable from Keypad

Fully Programmable by Computer

Multiple Inputs & Outputs

Serial Communication by:

RS232/422/485

HART™

Foundation Fieldbus™

MODBUS™

Measurements

Mass, Volume, Density & Temperature

Approvals

The ABB MassMeter is available with a wide range of approvals for both general and hazardous locations. These cover intrinsically safe and integrally mounted explosion-proof* versions. This dual approach gives the customer the maximum choice when selecting equipment for a particular application.

*For details of this version see separate Specification Sheet.
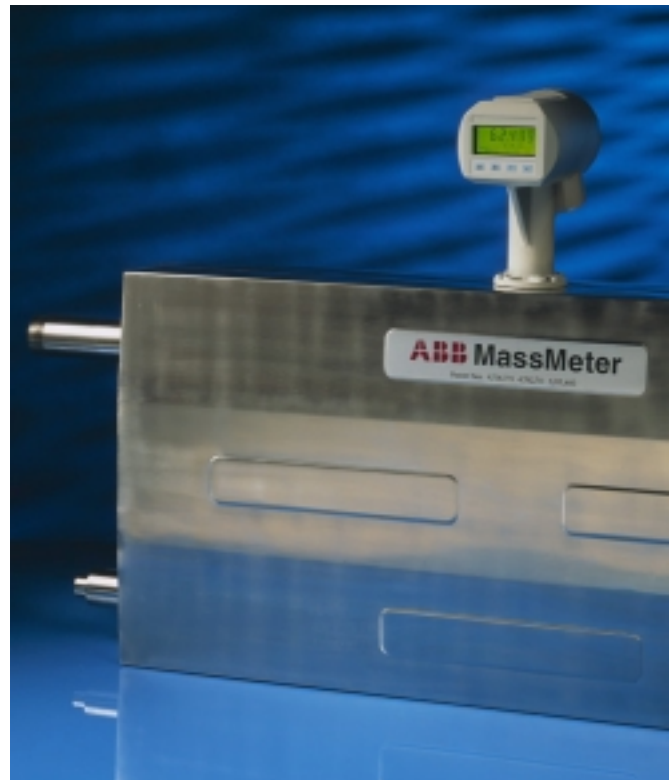
MassMeter – Exd

Remote Diagnostics

ABB's Microprocessor-based transmitters offer a variety of powerful operational and diagnostic functions at your fingertips. The keys on the front panel enable the user to gain access to the main menu, three levels of user passwords and a number of sub menus; allowing configuration of the meter for specific applications. Our 'Smart' Series 1200 transmitters combine the advantages of innovative design, microprocessor electronics and state-of-the-art digital technology with a communications format that provides a powerful, accurate and reliable interface between the field and the control room.

The Series 1200 transmitters come with RS 232 / 422 / 485 serial communications capability and can have the option of HART, Fieldbus or MODBUS if required.

For field installations, the Series 1200 transmitter is available in an explosion-proof, integrally-mounted version, or an intrinsically safe wall-mounted weatherproof version. The 1210 has a rugged IP65, NEMA 4X housing with an LCD display and keys for programming.

For installation in the control centre, the 1220 transmitter is available in a 19 in. rack-mounted version ($^1/_2$ rack). This package also includes an LCD display and an additional serial port connection for external communication from the front panel. In all cases, the indicator displays mass flow rate, density, temperature, frequency outputs and totalization in engineering units, together with any of the other parameters in the system.

Software support is available both pre- and post-sale. Pre-sale there is a Windows-based sizing, accuracy and pressure drop calculation system toolbox, which is simplicity itself to use and helps the user to plan which meter to use for optimum performance. Post-sale, ABB offer 'Screwdriver', a uniquely powerful aid for customers. Screwdriver supports communications, data logging, calibration, PID control, batch control and a host of other features.

Specification

Transmitters

Measuring range
Fully configurable within the limits of the sensor to which it is attached

Ambient temperature
−7°C to +60°C (20°F to 140°F) when fitted with display

Enclosure
Model 1210 – IP65 (NEMA 4X)
Model 1220 – 19" rack mount only

Supply voltage
115V or 230V a.c. ±15%, 45 to 65Hz, <20VA
18 to 30V d.c., <20W

Display
20-character, 2-line, backlit LCD configurable to all required units

Communications
RS232/422/485, MODBUS™ (Standard)
HART™ (Optional), Fieldbus™ (Optional)

Shipping weight
Model 1210   9kg (20 lb)
Model 1220   4.5kg (10 lb)
Exd. 3kg (7 lb)

Outputs

Current 1 (optional)
0 to 22 mA into 500Ω, fully configurable
(isolated or non-isolated).

Current 2 (optional)
0 to 22 mA into 500Ω fully configurable
(isolated or non-isolated).

Frequency 1 / Pulse 1
Open Collector 0.16Hz to 30kHz, <40mA at <35V

Frequency 2 / Pulse 2 (Optional)
Open Collector 0.16Hz to 30kHz, <40mA at <35V

Digital outputs
4 Open Collector Logic Outputs, <100mA at <35V

Serial outputs
RS232/422/485, MODBUS™ (Standard)
HART™ (Optional), Fieldbus™ (Optional)

Digital inputs
4 Logic Inputs (TTL, contact closure)

Analog input
0 to 5V d.c. configurable by Applications Program.

Approval Classification

Approval	Approval Classification	Remarks
FM	Class I Div 2 Groups A, B, C, & D	Intrinsically Safe output to sensor
CSA	Class I Div 2 Groups C & D	Intrinsically Safe output to sensor
CENELEC, GOST	EEx [ib] IIB T3/T6	Intrinsically Safe output to sensor
FM, CSA	General	

...Specification

MassMeter Sensors

Wetted material
316 Stainless Steel or Hastelloy™ C22

Case material
316 Stainless Steel

Process temperature range
−95°C[1,2] to 204°C[2] (−140°F[1,2] to 400° F[2]), K2 to K2500
−95°C[1,2] to 150°C[2] (−140°F[1,2] to 300°F[2]), K4000 to K15000

[1] May be limited by coupling rating.
[2] Temperature rating of hazardous approved sensors is limited in accordance with Gas Groups and T classification e.g. T3 max. 160°C

Accuracy
±0.15% of measured value + Zero Stability

Repeatability (Mass and flow range)
±0.05% of measured value + Zero stability

Response time
50 ms

Options
Secondary Enclosures are available for all sizes.
Heated and insulated jackets are also available.
Further information available on request.

Approval Classification

Approval	Approval Classification	Items in Approval Classes
FM, CSA	Class I Div 1 Groups C & D Groups A, B, C, & D Class II Div 1 or 2 Groups E, F & G	– All sizes – K2, K5, K20, K40, K100 – All sizes
FM	Class I Div 2 Groups A, B, C & D	– All sizes
CENELEC	EEx ib IIB T3/T6	– All sizes
FM, CSA	General	– All sizes

Model	Nominal Bore Size		Zero Stability		Density Accuracy	Flow Max		Press Max		Weight	
	mm	in.	kg/min	lb/min	g/cc	kg/min	lb/min	Bar	psi	kg	lb
K2	2	0.1	0.00009	0.0002	±0.015	1	2	68	1000	9	20
K5	3	0.2	0.0009	0.002	±0.003	2	5	150	2200	8	17
K20	5	0.3	0.0018	0.004	±0.003	10	20	150	2200	8	17
K40	6	0.4	0.0045	0.010	±0.002	20	40	150	2200	8	17
K100	12	0.5	0.007	0.015	±0.003	50	100	150	2200	11	25
K250	20	0.75	0.014	0.03	±0.003	110	250	122	1800	16	35
K500	25	1.0	0.054	0.12	±0.0005	225	500	122	1800	24	53
K2500	40	1.5	0.15	0.33	±0.0005	1200	2500	122	1800	51	113
K4000	80	3.0	0.41	0.90	±0.0002	2000	4000	102	1500	61	135
K15000	100	4.0	1.35	2.97	±0.0002	7000	20000	102	1500	250	551

Overall Dimensions

Models K5 to K 4000

Model K15000

560mm (22.1 in.) diameter
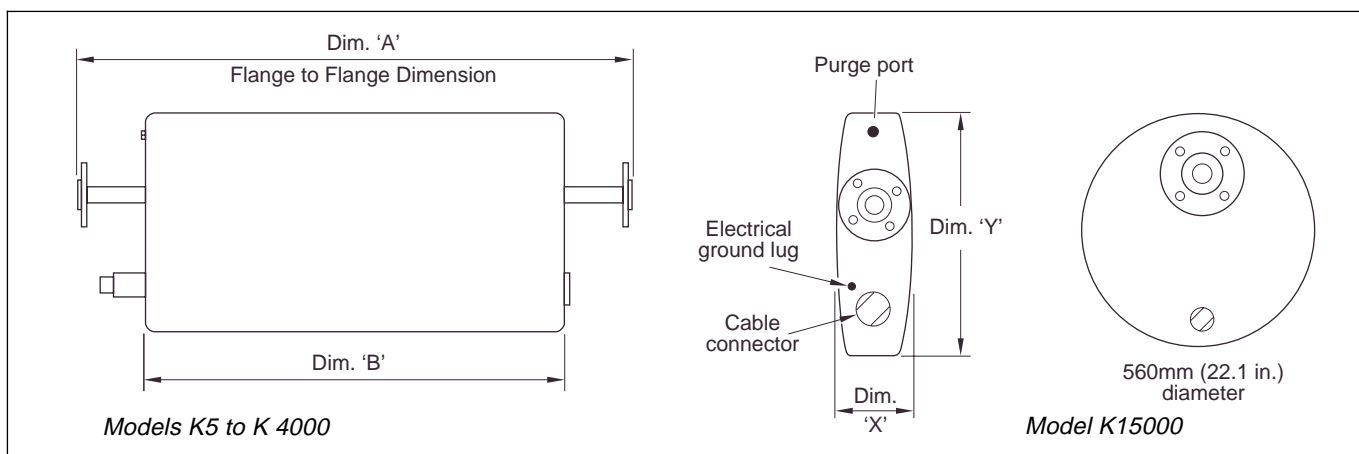
Model	A						B		X		Y	
	Flange		NPTM		Sanitary							
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
K5	640	25.16	660	26.18	622	24.50	423	16.6	82	3.23	203	8.0
K20	640	25.16	660	26.18	622	24.50	423	16.6	82	3.23	203	8.0
K40	640	25.16	660	26.18	613	24.13	423	16.6	82	3.23	203	8.0
K100	803	31.61	825	32.48	778	30.63	587	23.1	105	4.10	272	10.7
K250	894	35,20	917	36.10	876	34.50	670	26.3	118	4.70	320	12.6
K500	1013	39.88	1045	41.14	997	39.25	777	30.5	129	5.10	368	14.5
K2500	1185	46.65	1219	48.07	1168	46	919	36.1	174	6.90	448	17.6
K4000	1751	67.91	–	–	1751	67.90	1270	48.4	302	11.90	408	16.1
K15000	2042	25.16	–	–	2042	80.40	1535	57.0	565	22.10	565	22.1

Overall Dimensions

Dimensions in mm (in.)

Model K2

Dimensions in mm (in.)

View in direction A

¹/₂ in. NPT (Typ. 5 holes)

1210 Transmitter

Dimensions in mm (in.)

Front View

Rear View

Side View

1220 Transmitter
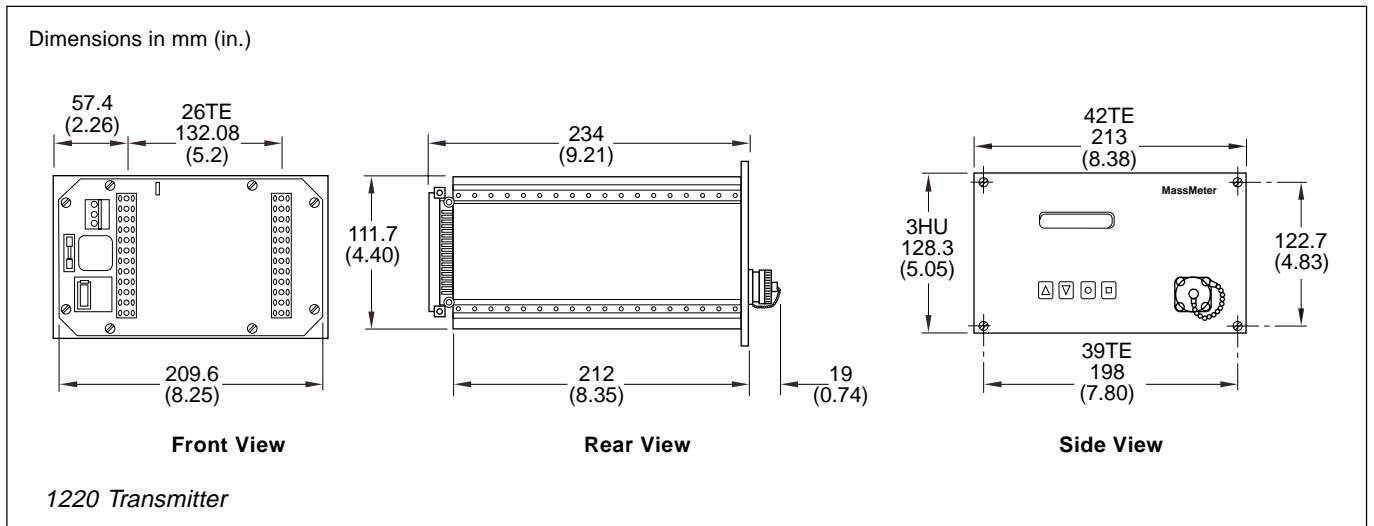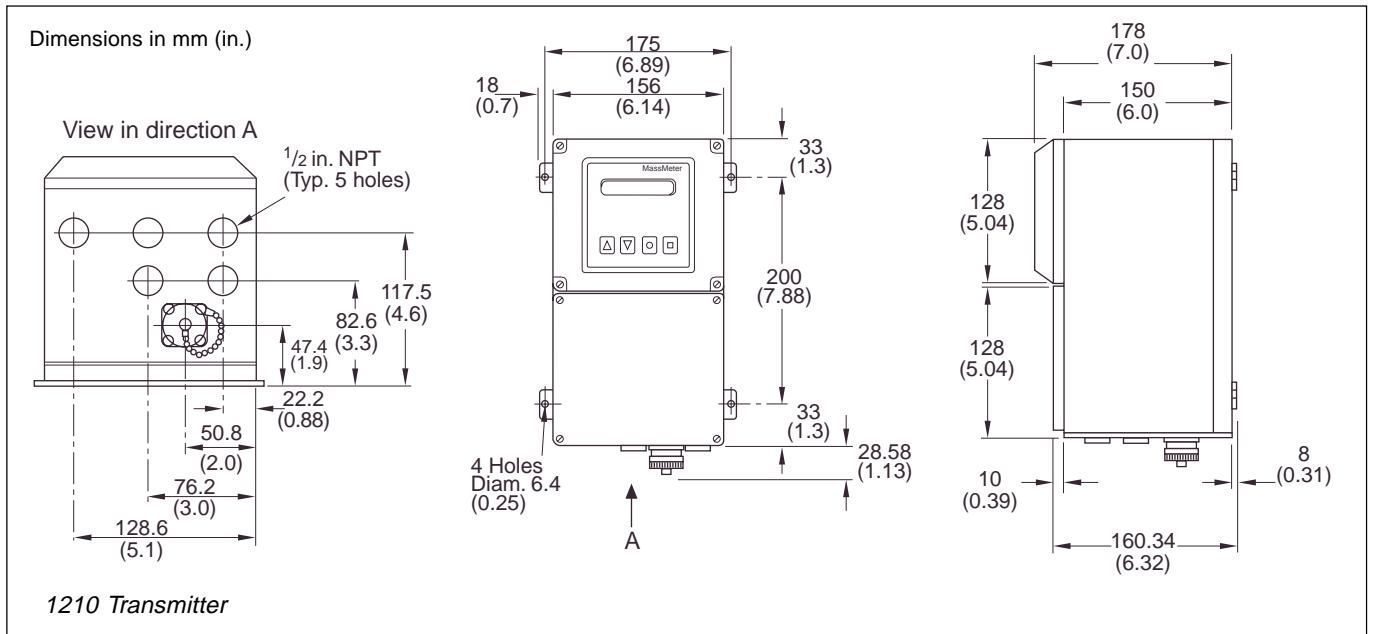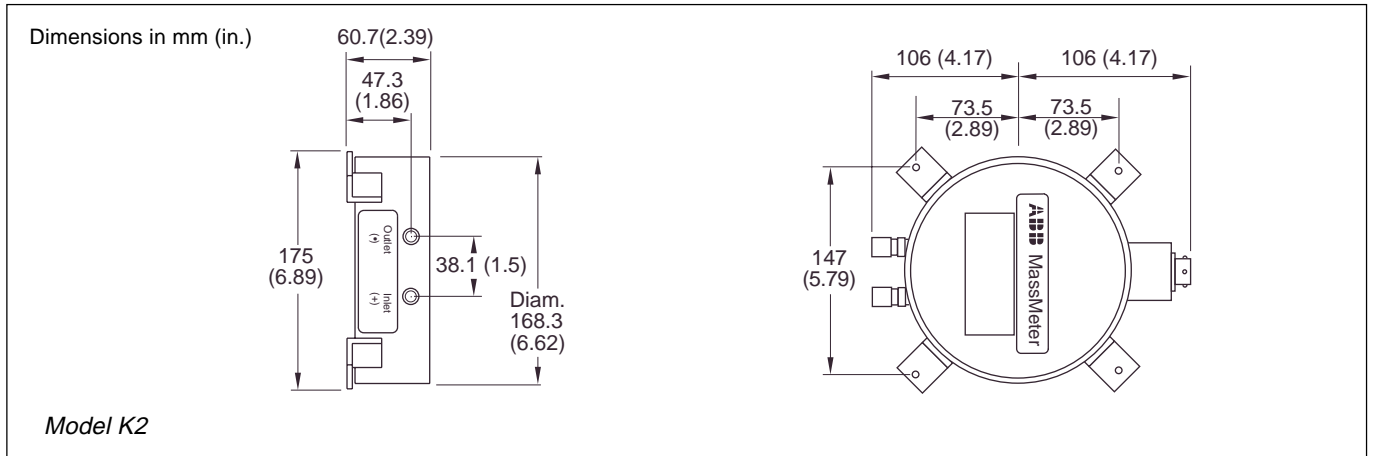
Sensor Ordering…

	MassMeter	X	X	X	X	X	X	X	X X X	X	X X	X	X	X	X	X
									See Page 7							
Sensor	None (transmitter only)	0														
	K2	1														
	K5	2														
	K20	3														
	K40	4														
	K100	5														
	K250	6														
	K500	7														
	K2500	8														
	K4000	A														
	K15000	B														
	Special	9														
Material	None (transmitter only)		0													
	C22 Hastelloy		H													
	316L Stainless Steel		S													
	Tantalum (K2 only)		T													
	Special		9													
Sensor Configuration	None (transmitter only)			0												
	Standard			S												
	K-CNG			C												
	High Pressure (K40 only)			H												
	Special			9												
Temperature Range	None (transmitter only)				0											
	Standard				1											
	Special				9											
Connections	None (transmitter only)					0										
	VCO					1										
	NPT					2										
	ANSI 150 (not K2)					3										
	ANSI 300 (not K2)					4										
	ANSI 600 (not K2)					5										
	Metric PN40 BAR (not K2) – ISO7005/1					6										
	Sanitary Tri-Clover (not K2)					7										
	Special					9										
Connection Size	None (transmitter only)						0									
	VCO						1									
	VCO/NPT						2									
	15mm						3									
	20mm						4									
	25mm						5									
	40mm						6									
	50mm						7									
	80mm						8									
	100mm						P									
	$1/_2$ in.						A									
	$3/_4$ in.						B									
	1 in.						C									
	$1^1/_2$ in.						E									
	2 in.						F									
	3 in.						G									
	4 in.						H									
	Special						9									
Sensor Options	None or transmitter only							0								
	Rupture Disk Holder							1								
	Secondary Enclosure – 150 psi rating							2								
	Secondary Enclosure – 300 psi rating							3								
	Secondary Enclosure – 600 psi rating							4								
	Secondary Enclosure – Special rating							5								
	Insulation Jacket							6								
	Special							9								

…Sensor Ordering

		MassMeter	X	X	X	X	X	X	X	X X X	X	X X	X	X	X	X	X
		See Page 6															
Cable Length	None									0 0 0							
	Cable length in metres (max 300m)									X X X							
	Special									9 9 9							
Cable Type	None										0						
	PVC (–20° to +80°C)										1						
	PTFE (–70° to +100°C)										2						
	Special										9						
Transmitter Type	None (Sensor only)											0 0					
	1210 Wall-mount											T W					
	1220 Rack-mount											T R					
	Explosion-proof Case											T X					
	Special											9 9					
Electrical Certification	None												0				
	Non-Approved												1				
	CENELEC/GOST	Hazardous approved											E				
	FM	Hazardous approved											F				
	CSA	Hazardous approved											C				
	FM/CSA	General approved											G				
Analog Outputs	None													0			
	Dual current o/p – ground Isolated													2			
	Dual current o/p + HART – ground Isolated													4			
	Dual current o/p – non-isolated													5			
	Dual Frequency													6			
	Dual current o/p + HART – non-isolated													7			
	Special													9			
Power Supply	None (sensor only)														0		
	115V a.c.														1		
	230V a.c.														2		
	18 to 36V d.c.														3		
	Special														9		
Transmitter Options	None															0	
	Net Oil															N	
	Special															9	
Application Program	None																0
	Standard																1
	Special																9

ABB MassMeter Software

ABB MassMeters have the benefit of unrivalled software support.

MassMeters – 'The Facts'

This is a stand-alone presentation of the principles and benefits of Coriolis Mass Flow Meters.

Toolbox™

Toolbox is of immense help in determining the best ABB MassMeter for your application, taking into account the required accuracy and acceptable pressure drop. This information is presented in a real-time interactive format in both tabular and graphical form. It can also be printed or exported to a word processor document.

Screwdriver™

Screwdriver is a whole world of software in itself. It allows on-line, real-time communication with ABB MassMeters and provides:

Data Logging with real-time and historic graphical and tabular display of data, with the added benefit of exporting the information directly to Microsoft Excel™ spreadsheet.

Batch Control, together with a visual set up screen, which is simplicity itself to use.

PID control which is again very simple to use.

Net Oil Computation, with the ability to cope with input from 40 wells.

Easy remote programming of transmitter.

Storage and retrieval of all transmitter program details, error and alarm messages.

Zeroing of sensor including data logging of results.

Remote Diagnostics which allows all normal servicing and diagnostics to be carried out by the factory by means of telephone communication.