

SmartLine® VersaFlow Coriolis 200 CM41 Size 100 Stainless Steel

Model Selection Guide with Price Data

Model Selection Guide
36-CM-16-29 Issue 18

Honeywell Proprietary

- Secondary pressure containment around sensor
- Easily drained and easy to clean
- Excellent zero stability
- Low energy consumption, low operating and installation costs
- Rapid signal processing even with product and temperature changes and sudden changes in density
- Modular electronics concept: electronics and sensor easy to replace



Instructions

Select the desired key number. The arrow to the right marks the selection available.
Make the desired selections from Tables I through VIII using the column below the proper arrow. A dot (•) denotes availability.

Table	I	II	III	IV	V	VI	VII	VIII	IX
CM41	4	-	-	-	-	-	-	-	-

List Price equals the sum of prices for all selections made.

KEY NUMBER	Description	Selection	Availability
CM41		CM41	↓
TABLE I			
Sensor		4	•
TABLE II			
Tube Material	Stainless Steel	S	•
Surface Finish	Standard (Better than 0.8µm) See Note 2	0	•
Connection Size - Flanges	DN 100 PN 16	G 7	•
	DN 100 PN 40 to DIN 2501	G A	•
	DN 100 PN 63 to DIN 2501	G B	•
	DN 100 PN 100 to DIN 2501	G C	•
	DN 150 PN 16	1 7	•
	DN 150 PN 40 to DIN 2501	1 A	•
	DN 150 PN 63 to DIN 2501	1 B	•
	DN 150 PN 100 to DIN 2501	1 C	•
	4" ASME 150 lb	S D	•
	4" ASME 300 lb	S E	•
	4" ASME 600 lb	S F	•
	6" ASME 150 lb	4 D	•
	6" ASME 300 lb	4 E	•
6" ASME 600 lb	4 F	•	
100 A JIS 10 K	Z G	•	
100 A JIS 20 K	Z H	•	
TABLE III			
Sealing face	Standard (Type B1 for PN 40 & B2 for PN 63/100 acc. EN 1092-1) EN 1092-1 Type C with tongue EN 1092-1 Type D with groove RTJ Acc ASME B16.5	0 C D E	• a a c

The minimum value of orders acceptable for Honeywell is USD 500. Handling fee is the amount of the difference between USD 500 and the actual purchase price.

TABLE IV

		Selection	Availability
Secondary Containment	SS 304 L	Typical Burst pressure >100 BarG	G _ •
	SS 316 L	Typical Burst pressure >100 BarG	H _ •
	Duplex	Max sec. containment 150 bar / 2175psi (PED Approved)	6 _ •
Options	None		_ 0 •
	Liquid/steam heating jacket-DN25 PN40	(max.temp 130°C/266°F)	_ 1 •
	Liquid/steam heating jacket-ASME 150 lb Flange	(max.temp 130°C/266°F)	_ 2 •
	Purge fittings-1/2" NPTF		_ 3 •
	Burst disk in outer cylinder, 3/4" (rec. for gas applications >40 barG ; Burst disk must be fitted on all meters operating at 100 bar or greater.)		_ B •
	Liquid/steam heating jacket - 1" NPT	(max.temp 130°C/266°F)	_ C •
Liquid/steam heating jacket Ermeto 25	(max.temp 130°C/266°F)	_ D •	

TABLE V

Hazardous Area Approvals	None	0 _ •
	ATEX Ex ia (T1-T6)	1 _ •
	cFMus (US standards)	T _ •
	cFMus (Canadian Standards) / Dual seal for liquids	U _ •
	cFMus (Canadian Standards) / Dual seal for gases	V _ •
IEC Ex ia (T1-T6)	R _ •	
Sanitary & Material Approvals	None	_ 0 •
	NACE according to MR0175/ISO 15156	_ N •

TABLE VI

Configuration	Compact/integral mount	0 _ _ •
	Remote/field mount Alu Junction box	1 _ _ •
	Remote/field mount SS Junction box	2 _ _ •
Calibration	Standard 3 point flow and density calibration	_ 0 _ _ •
	5 point calibration evenly spread accros nom. flow rate	_ 1 _ _ •
	0 + custom density calibration with water at 3 temps. + certificate	_ A _ _ •
	1 + custom density calibration with water at 3 temps. + certificate	_ B _ _ •
	5 point mass flow calibration + UKAS certificate (CT Calibration)	_ D _ _ •
	5 point volume flow calibration + UKAS certificate* (CT Calibration)	_ E _ _ •
	10 point mass flow calibration + UKAS certificate (CT Master Calibration)	_ G _ _ •
	10 point volume flow calibration + UKAS certificate* (CT Master Calibration)	_ H _ _ •
	10 point mass flow calibration bi-directional + UKAS certificate (CT Master Calibration)	_ K _ _ •
10 point volume flow calibration bi-directional + UKAS certificate* (CT Master Calibration)	_ L _ _ •	
Cleaning/ Degreasing	None	_ _ 0 _ •
	Degreasing wetted parts plus certificate	_ _ 1 _ •
Custody Transfer (See Note 3)	None	_ _ _ 0 •

TABLE VII

No Selection	None	V	•
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TABLE VIII

Converter Type	TWC 9400 Compact mount	Requires a separate MSG# to be entered. Either CM96 MSG# 36-CM-16-50 or CM97 MSG# 36-CM-16-52	6 _ •
	TWC 9400 Field mount		7 _ •
Destination	Other		_ 0 •

Table IX

Functional Safety	Without	0	•
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RESTRICTIONS

Restriction		Available only with	Not available with	
Letter	Table	Selection	Table	Selection
a	II	_ _ GA, _ _ GB, _ _ GC, _ _ G4, _ _ 1A, _ _ 1B, _ _ 1C		
c	II	_ _ SD, _ _ SE, _ _ SF, _ _ 4D, _ _ 4E, _ _ 4F,		

Secondary Containment Information + Polishing Information**Note 1****Secondary Containment Information**

The following information is provided to try to simplify the selection of the secondary containment /outer casing option

- G All externals SS 304/L No secondary pressure containment. Typical burst pressure > 100 bar
- H All externals SS 316/L No secondary pressure containment. Typical burst pressure > 100 bar

Notes:

1. There are no longer any flange constraints for options G and H
2. You may now choose the required outer casing (option G and H) in combination with any process connection irrespective of the pressure rating.
3. Most applications do not require secondary containment, so the 304L (option G) may be used unless 316L is specifically requested.
4. The food and pharmaceutical industries require 316L materials in most cases so option H will be suitable here.

Warning

In the case of high pressure gases, gases kept as liquids at high pressures and/or where there is a danger of the measuring tube failing due to process conditions, e.g. with erosive or corrosive products, it is strongly recommended that a secondary pressure containment option is purchased. Where process pressures exceed the secondary containment pressure rating, an optional burst disc should be fitted. This is highly recommended for High pressure gases. Please consult factory.

Note 2**Polishing Information**

1. To guarantee the surface finish of a CM Coriolis Meter, it is mandatory to order the polishing option as per the price list
2. This is also mandatory for a meter requested with hygienic approvals
3. For CM meters, the typical surface finish is <0.8 µm as standard
4. For all other meters, the surface finish can not be guaranteed unless polishing is ordered as per 1.

Note 3 - Custody Transfer (CT) SensorWhat is MID?

MID is the Measurement Instruments Directive 2004/22/EC which was introduced by the European Union in an attempt to harmonise the different standards for CT metering. MI-005 is the section of the directive that is applicable.

What is OIML R117-1?

OIML (Organisation Internationale de Metrologie Légale) R117-1 is the standard that was used for the performance tests. It is designed to be the primary standard in Europe and so assist pan-European business by replacing individual country approvals that would otherwise have to be applied for and tested against on an individual basis.

Although the original standard was written around volumetric measurement, R117-1 is the updated version and has taken the impact and usage of Coriolis flowmeters and measurement of mass into consideration. Primarily the standard tests for flow measurement accuracy using both petroleum and water, but it also requires testing for:

- EMC compatibility
- Environmental (high and low temperature) effects testing
- Robustness and integrity of hardware (sensor and converter) and software (converter).
- Password protection and mechanical locking to prevent tampering and adjustment of calibration parameters.

The Coriolis 200 has successfully passed the requirements of this approval.

Accuracy classes defined by OIML R117-1

The OIML R117-1 standard classifies applications according to five differing accuracy classes. However, when considering VersaFlow Coriolis meters, only four are of interest to us with typical processes:

Class 0.3

Measuring systems on pipelines, sometimes called the "pipeline transfer" standard, which is required for applications where flows are for long periods of time e.g. oil transfer between storage tanks or long distance pumping transfer.

Class 0.5

All other measuring systems (if not explicitly stated in another class) e.g. loading / unloading of ships, railcars and road tankers.

Also included here are milk measurement applications, and by extension, other food products.

Measuring systems for re-fuelling aircraft.

Class 1.0

Measuring systems for liquefied gases under pressure at a temperature equal to or above -10°C.

Also, measuring systems that would normally be classes 0.3 or 0.5, but used for liquids where temperature is less than -10°C or greater than +50°C

Class 1.5

Measuring systems for liquefied carbon dioxide.

And for liquefied gases under pressure at a temperature below -10°C.

We have approval to accuracy class 0.3% - the highest standard described. This means that the measurement error is never more than +/- 0.3% for either mass or volume flow over the flow range described for each system. The meter alone should achieve +/- 0.2% accuracy during the approval test, in order to pass this category. By logical inclusion, if the meter is tested, approved and certified for class 0.3, then it is absolutely suitable for applications defined in the lower accuracy classes.

What is the difference between the "test report" and an "evaluation certificate" or "type approval"?

The NMI in the Netherlands tested VersaFlow Coriolis according to OIML R117-1 and issued a "Test Report". This describes exactly what tests were done and can be used by other test houses as part of an evaluation.

VersaFlow Coriolis was also evaluated according to Directive 2004/22/EC (MID) and an "Evaluation Report" was issued. This describes how VersaFlow Coriolis complies with the parts of MID Annex MI-005 relevant for flow meters. A "Type Approval" certificate is issued for a complete system that complies with the relevant Annex of the MID directive.

MID Annex MI-005 only permits "Type Approval" certificates to be issued for complete systems, which VersaFlow Coriolis on its own does not constitute.

How to obtain a "country specific approval" for outside the EU

You must submit the complete technical test file to the relevant agency in your country. Many will recognise already OIML R117-1 or have a reciprocal agreement with the NMI, and so the issuing of CT certificates may be a "paperwork" formality with no requirement to make actual flow tests.

There will normally be some sort of charge for this administration process, and this is the responsibility of the local sales company to pay. Mass Flow Product Management will not bear these costs.

If this is not the case, and actual flow tests are required, then we ask that you contact us for advice.

Note 3 - Custody Transfer (CT) Sensor (continued)

Fluids that are approved under OIML R117-1

Any hydrocarbon, aqueous based or solvent liquid.

Liquids can be mixtures including solid particles or water providing they are completely homogeneously mixed. Two-phase flow conditions are not included.

There must be no entrained air or gas in the liquid; indeed the standard specifically states that degassing equipment must be installed if this condition is suspected.

Liquefied gases (e.g. propane, butane and ethane) are also included in the standard.

Gas flow applications, where the fluid is truly in its gaseous phase are not included.

Meter sizes available

Both Ex and non-hazardous duty meters are allowed.

The Coriolis 200 is included in all sizes.

Flow range limits

Coriolis 200:

Accuracy class 0.3 defines a maximum turndown of 1:20 from the maximum flow rate specified in the evaluation certificate for the meter size.

Consult the Coriolis 200 Technical Data Sheet for additional information.

Process connections possible

These are limited to flanges only (with one exception described later). The flanges must normally be the same size as the measuring tube e.g. DN100 for S 100 or 6" 150# for S 150. 80 for T 80.

DIN, ANSI or JIS pattern flanges are all allowed.

Oversized flanges e.g. DN 40 for T 25 or DN 100 for T 80 are not recommended, since the step change that occurs at the pipe <-> meter flange joint creates flow turbulence that may cause measurement errors.

Different pressure rated flanges (within the overall tube and secondary containment rating) are possible, providing they are meter measuring tube sized.

Hygienic and aseptic connections that use a clamp and O ring are not allowed since these lack sufficient mechanical rigidity to ensure a stable long-term zero calibration position.

The one exception to this is the DIN 11864-2 hygienic flange that can be used, since this is secured using four bolts that provide a rigid and stable installation.

Meter selection and sizing – fluid velocity

There will always be a natural tendency to select the smallest meter size possible in order to operate high up the turndown range and so reduce the measurement error.

This can be problematic as this can give a high fluid velocity that in certain applications such as hydrocarbon flow measurement are not permitted. This problem is exacerbated with low density fluids (such as hydrocarbons or liquefied gases) that always give a volume flow greater than their equivalent mass flow.

Please therefore always use the Optimass sizing software and confirm with your customer the velocity calculations are acceptable.

Signal converter options (See Signal Converter MSG for applicable restrictions).

Only the TWC9000 converter is included in the test report, in compact and remote versions. Not Available with CM90 or CM93

To comply with the requirements of OIML R117-1, it is necessary that 2-phase shifted pulse or frequency outputs are provided.

2 Pulse/Frequency IO modules must be provided and programmed with a phase shift to each other, and these must be available on terminals B&D or B&A to permit phaseshifting.

A limited number of options were tested for EMC effects and these are listed in the certificate.

The following output options are listed:

Modular I/O: 48C, 4AC, 4CC

Fixed I/O: 210, 220, 310, 320

This dual phase pulse is used in conjunction with CT approved batch counters accepting the same type of input. It is designed to prevent counting errors or pulse losses by requiring that each flow increment is represented by two pulses, both of which must be received within a certain period of time before the count is registered.

All power supply options are permitted.

In case of further queries, please contact Product Management

