

Resolució de la Gerència de la societat municipal SERVEIS MUNICIPALS SANT QUIRZE, S.L.U.

ASSUMPTE: Motivació de la necessitat, justificació, i adjudicació del contracte del "Subministrament dels cabalímetres digitals pels dipòsits, en execució de les inversions del "Projecte d'Instal·lació de 10 cabalímetres digitals i control de la pressió a sectors P09", per la millora de la Xarxa de distribució d'aigua potable gestionada per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua, Projecte(P09)."

Exp. 51/2025/SMSQV/CO."

Aquest contracte és regula per la llei 9/2017, de 8 de novembre de Contractes del Sector Públic, que va entrar en vigor el 9 de març de 2018.

Dades del contracte.

Tipus de contracte/s: contracte de Subministrament.
Subministrament dels cabalímetres digitals pels dipòsits, en execució de les inversions del "Projecte d'Instal·lació de 10 cabalímetres digitals i control de la pressió a sectors P09", per la millora de la Xarxa de distribució d'aigua potable gestionada per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua, Projecte(P09).
Objecte: L'objecte d'aquest contracte és el Subministrament dels cabalímetres digitals pels dipòsits, en execució de les inversions del "Projecte d'Instal·lació de 10 cabalímetres digitals i control de la pressió a sectors P09", per la millora de la Xarxa de distribució d'aigua potable gestionada per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua, Projecte(P09).".
Pressupostos base de licitació. El pressupost base de licitació del contracte de subministraments és de 46.828,39 euros (sense IVA 21%) i de 56.662,35 euros IVA inclòs.
Procediment: Obert simplificat sumari
Tramitació: Ordinària

Termini de durada del contracte: 2 mesos
Possibles prorrogues: NO.
Divisió en Lots: NO
Valor total estimat del contracte. El valor total estimat del contracte és de 46.828,39 euros (sense IVA 21%).

ANTECEDENTS.

Els dia 3 de gener de 2023 l'empresa municipal Serveis Municipals Sant Quirze, SLU. – SQVaigua va iniciar la prestació del Servei municipal d'abastament i distribució d'aigua potable a Sant Quirze del Vallès.

Pel bon funcionament de l'empresa "Serveis Municipals Sant Quirze S.L.U. - SQVaigua" és necessari dotar-se, entre d'altres instruments, d'un contracte de Subministrament dels cabalímetres digitals pels dipòsits, en execució de les inversions del "Projecte d'Instal·lació de 10 cabalímetres digitals i control de la pressió a sectors P09", per la millora de la Xarxa de distribució d'aigua potable gestionada per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua, Projecte(P09).

DESCRIPCIÓ DE L'OBJECTE DEL CONTRACTE.

L'objecte del present contracte és l'adquisició de 10 cabalímetres per inversions en la millora de la Xarxa de distribució d'aigua potable gestionada per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua.

PRESSUPOST BASE LICITACIÓ I VALOR ESTIMAT.

El pressupost base de licitació del contracte de subministraments és de 46.828,39 euros (sense IVA 21%) i de 56.662,35 euros IVA inclòs.

No es preveuen modificacions.

El valor total estimat del contracte és de 46.828,39 euros (sense IVA 21%).

ADJUDICACIÓ DEL CONTRACTE:

D'acord amb la Llei de contractes del sector públic es tracta d'un contracte de subministraments d'un valor total estimat del contracte, de 29.300,00 euros abans d'IVA, import total inferior a 60.000 euros (sense IVA). L'objecte del contracte NO es divideix en lots, ja que no és possible al tractar-se d'una única prestació diferenciada.

El procediment tramitació del contracte és un procediment Obert simplificat sumari. L'expedient s'ha tramitat de forma ordinària, sense reducció de terminis.

En data 01/07/2025 a les 11:40 hores es va publicar al perfil del contractant de Serveis Municipals Sant Quirze SLU. (<https://contractaciopublica.cat/ca/detall-publicacio/300498296>) l'anunci de licitació de contracte del Subministrament dels cabalímetres digitals pels dipòsits, en execució de les inversions del "Projecte d'Instal·lació de 10 cabalímetres digitals i control de la pressió a sectors P09", per la millora de la Xarxa de distribució d'aigua potable gestionada per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua, Projecte(P09).

Dins del termini per a la presentació d'ofertes que finalitzava el dia 16/07/2025, a les 14:00:00, s'han presentat quatre (5) proposicions mitjançant el sobre digital del programari e-Licita, d'acord amb el quadre següent:



Certificat de l'eina Sobre Digital

Per a la licitació corresponent a "Subministrament dels cabalímetres digitals pels dipòsits per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua." amb el codi d'expedient "51/2025/SMSQV/CO" que finalitza el termini per a la presentació d'ofertes el dia 16/07/2025, a les 14:00:00, les proposicions presentades mitjançant l'eina de Sobre Digital són les que es relacionen a continuació:

Denominació social	NIF	Data d'entrada	Hora d'entrada	Registre d'entrada
Frans Bonhomme España, S.L.U.	B63571426	04/07/2025	15:02:43	E2025000226
3G AGUAS S.L.	B60917143	08/07/2025	15:00:29	E2025000228
LLABERIA PLASTICS	B43408533	09/07/2025	14:47:50	E2025000239
DOMINI AMBIENTAL S.L.	B63078992	10/07/2025	10:38:29	E2025000240
GERMAL S.A.	A17040361	16/07/2025	13:26:15	E2025000252

En data 17 de juliol de 2025 s'ha procedit a l'obertura telemàtica de les ofertes presentades.



Registre d'obertura de telemàtica

Licitació: 51/2025/SMSQV/CO

Sobre: Telemàtica

Data	Acció
17/07/2025 16:17:41	L'usuari gestor Xavier Ludevid i Massana ha obert el sobre telemàtica, a data i hora 17/07/2025 16:17:41.

PROCEDIMENT D'ADJUDICACIÓ

El procediment d'adjudicació del contracte de Subministraments s'efectua utilitzant el procediment obert simplificat sumari, i es basarà en el principi de millor relació qualitat-preu.

COMPROVACIO DE LA DOCUMENTACIÓ PRESENTADA.

S'ha comprovat la documentació presentada per les empreses licitadores, detectant-se les següents mancances:

- 3G AGUAS S.L, aporta la documentació correctament, però en la documentació de l'ANNEX 3 hem constatat que l'ANNEX 4: FITXES TÈCNIQUES DEL MATERIAL A SUBMINISTRAR no s'especifica si els cabalímetres i els seu equipament tècnic poden transmetre les dades pel sistema LoRaWAN, protocol de comunicació obert dissenyat per a xarxes d'àrea ampla de llarg abast, que permet a dispositius IoT interconnectar-se sense fils amb baix consum d'energia. El dia 21 de juliol de 2025 se li va fer un requeriment perquè completés la documentació en un termini màxim de 3 dies hàbils. 3G AGUAS S.L, ha apartat la documentació requerida correctament en data 22 de juliol de 2025.

CRITERIS DE VALORACIÓ DE LES OFERTES.

Com a únics criteris d'adjudicació quantificables mitjançant la mera aplicació de fórmules, segons el que preveu l'article 145 de la LCSP, en aquest contracte es valoraran la baixa sobre el preu total en el seu conjunt i l'ampliació del termini de garantia. La xifra proposada de baixa es calcularà amb dos decimals.

Els criteris d'adjudicació que s'aplicaran per adjudicar el contracte per poder obtenir la millor relació qualitat-preu són:

- Oferta econòmica: Puntuació màxima 90 punts. Els punts s'atorgaran de forma proporcional segons la fórmula $P_i = 90 \times (PUL - PUOF) / (PUL - PUM)$

Els licitadors hauran de fer una oferta sobre el preu total del Pressupost Base de Licitació (IVA exclòs); les ofertes hauran de ser iguals o inferiors al Pressupost Base de Licitació i l'oferta que no realitzi cap baixa amb 0 punts, atribuint-se als restants imports la puntuació que resulta de la forma de càlcul establerta.

P = Puntuació obtinguda.

PM = Puntuació màxima possible (100 punts)

PUL = Preu objecte de licitació.

$PUOF$ = Preu proposat pel licitador

PUM = Preu més baix proposat pels licitadors.

- Ampliació del termini de garantia: Puntuació màxima 10 punts.

Es valorarà que els licitadors proposin un període de garantia superior al mínim d'un any establert a la clàusula 5a "Garantia" del Plec de condicions tècniques particulars, de la següent forma:

	Puntuació
Termini de garantia de 2 anys	1 punts

Termini de garantia de 3 anys	3 punts
Termini de garantia de 4 anys	6 punts
Termini de garantia de 5 anys	10 punts

ANÀLISI COMPRAT DE LES OFERTES PRESENTADES.

L'anàlisi comparatiu és el següent:

FRANSBONHOMME	
Preu oferta (UT) *	Import oferta
9,00 €/Ut	234,00 €
23,35 €/Ut	607,10 €
8,70 €/Ut	226,20 €
7,24 €/Ut	28,96 €
13,90 €/Ut	55,60 €
5,14 €/Ut	20,56 €
2.975,00 €/Ut	38.675,00 €
2.599,00 €/Ut	5.198,00 €
Base	45.045,42 €
IVA	9.459,54 €
Total	54.504,96 €
Punts	19,98 Punts

Termini de garantia	1 anys
Punts	1,00 Punts

Punts totals	20,98 Punts
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DOMINI AMBIENTAL	
Preu oferta (UT) *	Import oferta
15,62 €/Ut	406,12 €
25,14 €/Ut	653,64 €
10,06 €/Ut	261,56 €
6,97 €/Ut	27,88 €
14,47 €/Ut	57,88 €
5,50 €/Ut	22,00 €
2.563,07 €/Ut	33.319,91 €
2.364,12 €/Ut	4.728,24 €
Base	39.477,23 €
IVA	8.290,22 €
Total	47.767,45 €
Punts	82,40 Punts

Termini de garantia	5 anys
Punts	10,00 Punts

Punts totals	92,40 Punts
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3G-AGUAS	
Preu oferta (UT) *	Import oferta
11,36 €/Ut	295,36 €
12,10 €/Ut	314,60 €
12,54 €/Ut	326,04 €
5,71 €/Ut	22,84 €
7,95 €/Ut	31,80 €
5,90 €/Ut	23,60 €
2.536,40 €/Ut	32.973,20 €
2.405,75 €/Ut	4.811,50 €
Base	38.798,94 €
IVA	8.147,78 €
Total	46.946,72 €
Punts	90,00 Punts

Termini de garantia	5 anys
Punts	10,00 Punts

Punts totals	100,00 Punts
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GERSAL	
Preu oferta (UT) *	Import oferta
16,16 €/Ut	420,16 €
12,00 €/Ut	312,00 €
9,40 €/Ut	244,40 €
5,80 €/Ut	23,20 €
14,21 €/Ut	56,84 €
5,00 €/Ut	20,00 €
2.985,00 €/Ut	38.805,00 €
2.600,00 €/Ut	5.200,00 €
Base	45.081,60 €
IVA	9.467,14 €
Total	54.548,74 €
Punts	19,58 Punts

Termini de garantia	1 anys
Punts	1,00 Punts

Punts totals	20,58 Punts
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LLABERIA	
Preu oferta (UT) *	Import oferta
11,17 €/Ut	290,42 €
9,46 €/Ut	245,96 €
9,98 €/Ut	259,48 €
4,79 €/Ut	19,16 €
8,86 €/Ut	35,44 €
5,17 €/Ut	20,68 €
2.899,89 €/Ut	37.698,57 €
2.571,80 €/Ut	5.143,60 €
Base	43.713,31 €
IVA	9.179,80 €
Total	52.893,11 €
Punts	34,92 Punts

Termini de garantia	1 anys
Punts	1,00 Punts

Punts totals	35,92 Punts
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VALORACIÓ DE L'EXISTÈNCIA DE BAIXES PRESUMPTAMENT ANORMALS.

Una vegada fet l'anàlisi de les ofertes presentades, cal fer el càlcul solament de l'oferta econòmica per valorar si hi ha baixes presumptament anormals, d'acord amb la clàusula 27.a del plec de clàusules administratives particulars que regeix aquest contracte s'estableix que, "Si concorren tres o més empreses licitadores, es considerarà anormalment baixa quan l'oferta econòmica proposada sigui inferior en més del 10% a la mitjana aritmètica de les ofertes econòmiques presentades."

Aquest càlcul s'expressa en els quadres de números que s'adjunta a continuació:

Càlcul de baixa presumptament anormal

	Preu oferta	Dif. Mitjana	%
FRANSBONHOMME	45.045,42 €	2.622,12 €	5,82%
3G-AGUAS	38.798,94 €	-3.624,36 €	-9,34%
LLABERIA	43.713,31 €	1.290,01 €	2,95%
DOMINI AMBIENTAL	39.477,23 €	-2.946,07 €	-7,46%
GERSAL	45.081,60 €	2.658,30 €	5,90%
Mitjana	42.423,30 €		

Cap de les ofertes es pot considerar anormalment baixa.

PROPOSTA ADJUDICACIÓ.

El present contracte de subministrament es proposa que s'adjudiqui a 3G AGUAS S.L.. amb NIF núm. B60917143, per al "Subministrament dels cabalímetres digitals pels dipòsits, en execució de les inversions del "Projecte d'Instal·lació de 10 cabalímetres digitals i control de la pressió a sectors P09", per la millora de la Xarxa de distribució d'aigua potable gestionada per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua, Projecte(P09)." Exp. 51/2024/SMSQV/CO, amb uns preu unitaris d'acord amb la seva oferta, que es reproduïxen a continuació, per un preu total de 38.798,94 euros abans d'IVA amb termini de garantia de 5 anys.

		3G-AGUAS	
Material	Unitats	Preu oferta (UT) *	Import oferta
de PE 100 electrosoldable de DN 160 mm PN16	26	11,36 €/Ut	295,36 €
r DN 150 per a portabrides de 160 mm PN16	26	12,10 €/Ut	314,60 €
e PE 100 electrosoldable de DN 160 mm	26	12,54 €/Ut	326,04 €
de PE 100 electrosoldable de DN 110 mm PN16	4	5,71 €/Ut	22,84 €
r DN 100 per a portabrides de 110 mm PN16	4	7,95 €/Ut	31,80 €
e PE 100 electrosoldable de DN 110 mm	4	5,90 €/Ut	23,60 €
Cablimetre electromagnètic DN150 B-B PN16 (lector manual i connexió a telecontrol) model SITRANS FM MAG 8000 CT de SIEMENS amb Sensor de cabal electromagnètic alimentat per bateria, amb brida, homologat per a transaccions amb verificació. o equivalent.	13	2.536,40 €/Ut	32.973,20 €
Cablimetre electromagnètic DN100 B-B PN16 (lector manual i connexió a telecontrol) model SITRANS FM MAG 8000 CT de SIEMENS amb Sensor de cabal electromagnètic alimentat per bateria, amb brida, homologat per a transaccions amb verificació. o equivalent.	2	2.405,75 €/Ut	4.811,50 €
		Base	38.798,94 €
		IVA	8.147,78 €
		Total	46.946,72 €

inclou equip de juntes i cargols per a cada unió embreada.

S'adjunta l'oferta i la resta de documentació presentada d'acord al que requereix la present resolució.

JUSTIFICACIÓ CONFORME NO S'HA ALTERAT L'OBJECTE DEL CONTRACTE:

D'acord amb la l'article 118 de la llei 9/2017, de 8 de novembre de Contractes del Sector Públic, l'objecte d'aquest contracte no s'ha alterat per evitar l'aplicació de les regles generals de contractació. Es tracta d'un contracte de subministraments d'un import inferior als 60.000 euros (sense IVA).

TERMINI D'EXECUCIÓ O DURADA DEL CONTRACTE:

L'inici del contracte serà a partir de la data de la comunicació de l'adjudicació del contracte, i el termini d'execució serà de dos mesos.

PRESSUPOST D'ADJUDICACIÓ:

a) Import base:

Import base	38.798,94 €
Tipus d'IVA	21,00 %
Quota IVA	8.147,78 €
Import total d'adjudicació	46.946,72 €

b) Anualitats

L'execució d'aquest contracte està prevista durant l'exercici de 2025.

c) Aplicació pressupostària

La despesa derivada d'aquesta contractació es farà efectiva amb càrrec a la partida corresponent del pressupost de l'empresa Serveis Municipal Sant Quirze S.L.U., vigent.

d) Finançament

El finançament d'aquest contracte prové de fons propis.

e) Procediment de contractació:

D'acord amb la llei de contractes del sector públic es un contracte de subministrament d'import inferior als 60.000 € (sense IVA). El procediment d'adjudicació del contracte de subministrament s'efectua utilitzant el procediment obert simplificat sumari, i s'ha basat en el principi de millor relació qualitat-preu.

FORMA DE PAGAMENT.

El pagament es realitzarà en el termini màxim d'un mes des de la presentació de les factures mensuals corresponents a les prestacions realment efectuades en cadascun dels mesos en que s'han d'efectuar els subministraments.

MOTIVACIÓ D'INSUFICIÈNCIA DE MITJANS PROPIS.

Actualment l'empresa "Serveis Municipals Sant Quirze S.L.U" no disposa de personal propi per fer el subministrament de materials, i per tant és imprescindible fer aquest contracte de subministrament extern.

FONAMENTS DE DRET

Llei 9/2017, de 8 de novembre, de Contractes del Sector Públic, per la qual es transposen a l'ordenament jurídic espanyol les Directives del Parlament Europeu i del Consell 2014/23/UE i 2014/24/UE, de 26 de febrer de 2014.

Estatuts de la societat Serveis Municipals sant Quirze, SLU, publicats al Butlletí Oficial de la Província d'1 de juny de 2022.

Les Instruccions Internes de Contractació de la societat municipal Serveis Municipals Sant Quirze, SLU, aprovades per la Junta General de la societat el dia 24 de novembre de 2022.

L'acord del Consell d'Administració de l'empresa Serveis municipals Sant Quirze SLU de data 14 de desembre de 2022 de delegar en la gerència de la societat les facultats de contractació previstes a l'article 8e de les Instruccions Internes de Contractació de la societat municipal SERVEIS MUNICIPALS SANT QUIRZE S.L.U. de forma genèrica.

DISPOSICIÓ

D'acord amb els antecedents i els fonaments de dret assenyalats anteriorment, la gerència de l'empresa municipal Serveis municipals Sant Quirze SLU, ha resolt:

Primer.- Adjudicar el Contracte del Subministrament dels cabalímetres digitals pels dipòsits, en execució de les inversions del "Projecte d'Instal·lació de 10 cabalímetres digitals i control de la pressió a sectors P09", per la millora de la Xarxa de distribució d'aigua potable gestionada per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua, Projecte(P09)." Exp. 51/2024/SMSQV/CO, a 3G AGUAS S.L.. amb NIF núm. B60917143, amb els preu unitaris d'acord amb la seva oferta, que s'adjunta a la resolució, per un preu total de 38.798,94 euros abans d'IVA i amb termini de garantia de 5 anys.

Material	Unitats	3G-AGUAS	
		Preu oferta (UT) *	Import oferta
i de PE 100 electrosoldable de DN 160 mm PN16	26	11,36 €/Ut	295,36 €
r DN 150 per a portabrides de 160 mm PN16	26	12,10 €/Ut	314,60 €
e PE 100 electrosoldable de DN 160 mm	26	12,54 €/Ut	326,04 €
i de PE 100 electrosoldable de DN 110 mm PN16	4	5,71 €/Ut	22,84 €
r DN 100 per a portabrides de 110 mm PN16	4	7,95 €/Ut	31,80 €
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		Base	38.798,94 €
		IVA	8.147,78 €
		Total	46.946,72 €

inclou equip de juntes i cargols per a cada unió embreada.

Segon.- Aprovar la despesa per import de 46.946,72 euros, dels quals 38.798,94 euros corresponen a la base imposable i 8.147,78 euros a l'IVA, que s'imputarà dins del pressupost de l'exercici 2025 de la societat en el qual existeix crèdit suficient i adequat per atendre les obligacions derivades d'aquest contracte.

Tercer.- Notificar la present resolució a l'adjudicatària.

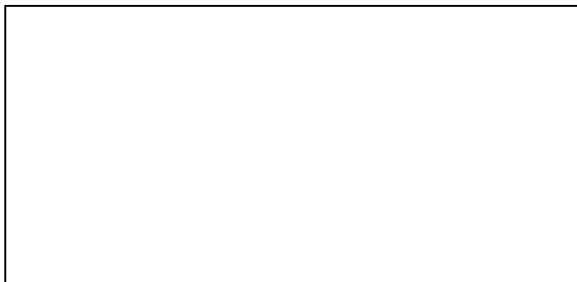
Quart.- Donar compte de la present resolució a la primera reunió que es porti a terme del Consell d'Administració de la societat.

D'acord amb l'article 44.6 de la LCSP, les actuacions realitzades per poders adjudicadors que no tinguin la condició d'administracions públiques en procediments d'adjudicació de contractes, aquesta resolució és susceptible del recurs d'alçada regulat als articles 121 i 122 de la Llei 39/2015, d'1 d'octubre, del Procediment Administratiu Comú de les Administracions Públiques, davant el titular del departament, òrgan, ens o organisme al qual estigui adscrita l'entitat contractant o al qual correspongui la seva tutela.

Informar que l'ordre jurisdiccional civil és el competent per resoldre les controvèrsies derivades d'aquest acte, d'acord amb l'article 27.2.a) de la Llei 9/2017, de 8 de novembre, de contractes del sector públic, per la qual es transposen a l'ordenament jurídic espanyol les directives del Parlament Europeu i del Consell 2014/23/UE i 2014/24/UE, de 26 de febrer de 2014, sense que es pugui interposar cap tipus de recurs en via administrativa.

Sant Quirze del Vallès, a la data de la signatura electrònica.

El Gerent



Xavier Ludevid i Massana

ANNEXOS. Plec de Clàusules Administratives Particulars.

Contractació del " Subministrament dels cabalímetres digitals pels dipòsits, en execució de les inversions del "Projecte d'Instal·lació de 10 cabalímetres digitals i control de la pressió a sectors P09", per la millora de la Xarxa de distribució d'aigua potable gestionada per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua, Projecte(P09)."

Exp. 51/2025/SQVSLU/CO."

Aquest contracte és regula per la llei 9/2017, de 8 de novembre de Contractes del Sector Públic, que va entrar en vigor el 9 de març de 2018.

Tipus de contracte/s: contracte de Subministrament.

Objecte: Subministrament dels cabalímetres digitals pels dipòsits, en execució de les inversions del "Projecte d'Instal·lació de 10 cabalímetres digitals i control de la pressió a sectors P09", per la millora de la Xarxa de distribució d'aigua potable gestionada per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua, Projecte(P09).

Entitat adjudicadora: Serveis Municipals Sant Quirze SLU. - SQVaigua.

Número d'expedient: 51/2025/SQVSLU/CO.

Procediment: Obert simplificat sumari

Tramitació: Ordinària

Tipus de contracte: Subministraments.

Divisió en Lots: NO

CPV: 42000000-6 Maquinària industrial.

Pressupost base de licitació: 56.662,35 euros IVA inclòs

Termini de durada del contracte: 2 mesos

Possibles prorrogues: NO.

ANNEX 1: DECLARACIÓ RESPONSABLE.

El Sr GABRIEL GALLARDO GARCIA , amb DNI núm 47736183M , actuant en nom i representació de 3G AGUAS SL (licitador) amb NIF núm. B60917143 , en la seva condició de administrador i amb poders suficients per subscriure la present declaració responsable, assabentat de la convocatòria del procediment de contractació per a l'adjudicació del contracte ""Subministrament dels cabalímetres digitals pels dipòsits, en execució de les inversions del "Projecte d'Instal·lació de 10 cabalímetres digitals i control de la pressió a sectors P09", per la millora de la Xarxa de distribució d'aigua potable gestionada per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua, Projecte(P09)." Exp. 51/2025/SQVSLU/CO."" ,

DECLARA RESPONSABLEMENT:

1. Que ni el licitador ni els seus administradors i/o representants incorre en cap de les prohibicions per a contractar amb l'administració recollides a l'article 71 de la LCSP.

2. Que el licitador compleix tots i cadascun dels requisits de capacitat i solvència establerts en el plec que regula el contracte abans esmentat i està en disposició i es compromet a aportar la documentació acreditativa d'aquests extrems, detallada a les clàusules referents a la solvència econòmica i tècnica del plec de clàusules administratives en el termini establert que li atorgui Serveis Municipals Sant Quirze SLU. – SQVaigua.

3. Que pel que fa a la subcontractació el licitador:

SÍ té prevista la subcontractació de part de les actuacions objecte del contracte i d'acord amb l'article 215 de la LCSP i es compromet a aportar, en cas de ser adjudicatari, el llistat d'empreses subcontractades per aquest contracte indicant la part de la prestació que es subcontractarà i justificant l'aptitud per executar-la per referència als elements tècnics i humans de que disposa, la seva experiència i acreditant que l'empresa/es subcontractades no es troben incurses en prohibició de contractar d'acord amb l'article 71 de la LCSP.

NO té prevista la subcontractació d'aquest contracte.

4. Que les dades afectes de rebre les comunicacions i notificacions derivades del procés de negociació i d'adjudicació s són les següents:

- a. Persona de contacte: Gabriel Gallardo Garcia
- b. Adreça electrònica: gabriel.gg@aintas.com
- c. Telèfon mòbil: 659587494

5. Que el licitador es troba al corrent d'obligacions tributàries amb l'Estat.

6. Que el licitador es troba al corrent d'obligacions tributàries amb la Generalitat de Catalunya.

7. Que el licitador es troba al corrent d'obligacions tributàries amb l'Ajuntament de Sant Quirze del Vallès .

8. Que el licitador es troba al corrent d'obligacions amb la Seguretat Social.

9. Que el licitador està donat d'alta a l'Impost sobre Activitats Econòmiques i al corrent del seu pagament, quan s'exerceixin activitats subjectes a aquest impost (indicar la possible exempció, en el seu cas).

10. Que, en cas que el licitador tingui intenció de concórrer en unió temporal d'empreses, declara:

SÍ té intenció de concórrer en unió temporal d'empreses:

(indicar noms i circumstàncies dels integrants i la participació de cadascun, així com l'assumpció del compromís de constituir-se formalment en unió temporal en cas de resultar adjudicatari)

NO té intenció de concórrer en unió temporal d'empreses.

11. Que el licitador autoritza Serveis Municipals Sant Quirze SLU. – SQVaigua, perquè pugui obtenir directament, davant de les Administracions competents, els certificats acreditatius del compliment de les obligacions tributàries i amb la Seguretat Social.

SÍ - NO

12. El licitador (contractista, subcontractista o empreses filials o empreses interposades) no té cap tipus de relació amb paradisos fiscals.

13. Que, en cas que es tracti d'empresa estrangera, es sotmet a la jurisdicció dels Jutjats i Tribunals espanyols en qualsevol ordre, per totes les incidències que de manera directa o indirecta es podessin produir per raó del contracte, amb renúncia, en el seu cas, al fur jurisdiccional estranger que els pugui correspondre.

14. Referent al formar part d'un grup empresarial, el licitador declara:

Que el licitador **NO** forma part de cap grup empresarial.

Que el licitador **SI** forma part d'un grup empresarial, però cap de les empreses vinculades participen en aquest procediment.

Que el licitador **SI** forma part d'un grup empresarial, i l'empresa

següent també participa en aquest procediment:

(especificar la raó social i CIF de l'empresa)

I als efectes oportuns, se signa la present declaració responsable, a 02 de

juliol de 2025

Signatura

47736183M

GABRIEL

GALLARDO (R:

B60917143)

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digitalmente por
47736183M GABRIEL
GALLARDO (R:
B60917143)
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ANNEX 2: DECLARACIÓ DE CONFIDENCIALITAT

El/la Sr./Sra. GABRIEL GALLARDO GARCIA , amb DNI núm. 47736183M , en nom propi o com a administrador de l'empresa 3G AGUAS SL, en nom i representació d'aquesta empresa, amb residència al carrer ELISA I MORAGAS número 3, i amb NIF. B60917143 , declara sota la seva responsabilitat que:

- Els documents i/o la informació que es detalla següidament tenen caràcter confidencial:

Les circumstàncies o els motius en què es fonamenta aquesta declaració per a cada un dels documents i/o informacions detallats són les/els següents:

.....

- Cap document i/o informació té el caràcter de confidencial. ☒

I perquè consti, signo aquesta declaració.

(lloc i data) Rubí, 08/07/2025

Signatura

47736183M

GABRIEL

GALLARDO (R:

B60917143)

Firmado digitalmente por

47736183M GABRIEL

GALLARDO (R:

B60917143)

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En cas de no marcar cap de les dues caselles, s'entendrà que l'empresa licitadora no declara cap document com a confidencial. No obstant això, correspondrà a l'òrgan de contractació, tenint en compte aquesta circumstància, valorar i declarar en el seu cas si algun o alguns dels documents que integren l'oferta ha de tenir la consideració de confidencial.

ANNEX 3: MODEL DE PROPOSICIÓ ECONÒMICA

El/la Sr/Sra GABRIEL GALLARDO GARCIA , amb residència a BARCELONA, carrer ELISA I MORAGAS número 3 , i amb NIF 47736183M , declara que, assabentat/ada de les condicions i els requisits que s'exigeixen per poder ser adjudicatari/a/ària del contracte "Subministrament dels cabalímetres digitals pels dipòsits, en execució de les inversions del "Projecte d'Instal·lació de 10 cabalímetres digitals i control de la pressió a sectors P09", per la millora de la Xarxa de distribució d'aigua potable gestionada per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua, Projecte(P09)." Exp. 51/2025/SMSQV/CO"., en nom propi / en nom i representació de l'empresa 3G AGUAS SL ,

Es compromet en nom propi / en nom i representació de l'empresa 3G AGUAS SL a executar-lo amb estricte subjecció als requisits i condicions estipulats, realitzant una proposta de preus unitaris d'acord amb el fitxer Excel anomenat "2025-05-23 PCAP ANNEX 3 Presentació ofertes Exp51-25.xls i el fitxer "2025-05-23 PCAP ANNEX 3 Presentació ofertes Exp51-25.PDF signat que annexa amb un valor total de 38.798,94€ (IVA exclòs).

Ofereix una ampliació del termini de garantia de 5 anys, expressat en anys, superior al mínim establert a la clàusula 5a "Garantia" del Plec de condicions tècniques particulars.

"

Emplenar els models:

- El full de càlcul en format Excel emplenat que s'adjunta amb el nom "2025-05-23 PCAP ANNEX 3 Presentació ofertes Exp51-25.xls" i
- El full de càlcul en format Excel, que s'adjunta, emplenat, imprès en PDF i signat, d'acord amb el fitxer model el nom "2025-05-23 PCAP ANNEX 3 Presentació ofertes Exp51-25.xls".

"

I perquè consti, signo aquesta oferta econòmica.

(lloc i data) Rubí, 08/07/2025

47736183M

GABRIEL

GALLARDO (R:

B60917143)

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por 47736183M
GABRIEL GALLARDO (R:
B60917143)
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ANNEX 4: FITXES TÈCNIQUES DEL MATERIAL A SUBMINISTRAR

DECLARACIÓ RESPONSABLE

El Sr./ La Sra. GABRIEL GALLARDO GARCIA , amb DNI núm 47736183M, actuant en nom i representació de 3G AGUAS SL , en la seva condició de ADMINISTRADOR i amb poders suficients per subscriure la present declaració responsable, assabentat/da de la convocatòria del procediment de contractació per a l'adjudicació del contracte **Subministrament dels cabalímetres digitals pels dipòsits per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua. Exp. 51/2025/SMSQV/CO**", DECLARA RESPONSABLEMENT:

1. Que la documentació que aporta annexada a aquest document són les fitxes tècniques del material a subministrar d'acord amb l'oferta presentada i la proposta d'adjudicació d'aquest contracte efectuat per la gerència de l'Empresa municipal Serveis Municipals sant Quirze SLU. – SQVaigua.

I als efectes oportuns, se signa la present declaració responsable, a 08 de JULIOL de 2025.

Signatura

47736183M
GABRIEL
GALLARDO (R:
B60917143)

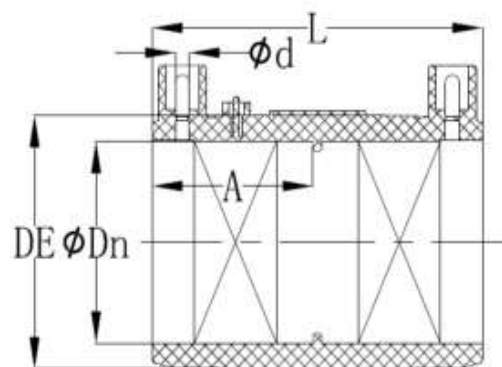
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por 47736183M
GABRIEL GALLARDO
(R: B60917143)
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Subministrament de Cabalimetres pels dipòsits. Exp. 51/2025/SMSQV/CO

Material	Unitats	Preu licitació	Import	Preu oferta (UT) *	Import oferta
Portabrides de PE 100 electrosoldable de DN 160 mm PN16	26	17,78 €/Ut	462,28 €	11,36 €/Ut	295,36 €
Brida d'acer DN 150 per a portabrides de 160 mm PN16	26	12,12 €/Ut	315,17 €	12,10 €/Ut	314,60 €
Maniguet de PE 100 electrosoldable de DN 160 mm	26	15,36 €/Ut	399,24 €	12,54 €/Ut	326,04 €
Portabrides de PE 100 electrosoldable de DN 110 mm PN16	4	9,86 €/Ut	39,46 €	5,71 €/Ut	22,84 €
Brida d'acer DN 100 per a portabrides de 110 mm PN16	4	19,74 €/Ut	78,98 €	7,95 €/Ut	31,80 €
Maniguet de PE 100 electrosoldable de DN 110 mm	4	8,32 €/Ut	33,26 €	5,90 €/Ut	23,60 €
Cablímetre electromagnètic DN150 B-B PN16 (lector manual i connexió a telecontrol) model SITRANS FM MAG 8000 CT de SIEMENS amb Sensor de cabal electromagnètic alimentat per bateria, amb brida, homologat per a transaccions amb verificació. o equivalent.	13	3.100,00 €/Ut	40.300,00 €	2.536,40 €/Ut	32.973,20 €
Cablímetre electromagnètic DN100 B-B PN16 (lector manual i connexió a telecontrol) model SITRANS FM MAG 8000 CT de SIEMENS amb Sensor de cabal electromagnètic alimentat per bateria, amb brida, homologat per a transaccions amb verificació. o equivalent.	2	2.600,00 €/Ut	5.200,00 €	2.405,75 €/Ut	4.811,50 €
		Base	46.828,39 €	Base	38.798,94 €
		IVA	9.833,96 €	IVA	8.147,78 €
inclou equip de juntes i cargols per a cada unió embridada.		Total	56.662,35 €	Total	46.946,72 €

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GABRIEL
GALLARDO (R:
B60917143)

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por 47736183M
GABRIEL GALLARDO
(R: B60917143)
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Dn /MM	KG		MM		
	SDR11	SDR17	A	L	DE
32	0,065	/	38	81	44
40	0,100	/	43	91	54
50	0,145	/	50	105	65
63	0,250	/	55	113	83
75	0,300	/	64	126	95
90	0,500	/	68	138	115
110	0,760	/	75	153	134
125	0,950	/	79	158	151
140	1,300	/	80	163	175
160	1,960	/	95	195	197
180	2,300	/	100	198	221
200	2,750	/	95	200	238
225	3,650	/	108	218	270
250	4,940	/	109	228	301
280	7,450	/	127	261	343
315	9,200	/	135	277	390
355	13,250	/	145	294	434
400	15,100	10,900	145	295	460

PE100, SDR11: 10 bar para gas, 16 bar para agua

ϕd : 4.7mm pin

ISO4437-3 / EN1555-3 / ISO4427-3 / EN12201-3 / ISO15494. AS/NZS 4129

ACQUA-SOLFIT se reserva el derecho de revisar esta ficha técnica, manteniendo el cumplimiento de los requisitos del producto sin previo aviso.
Tolerancia en diámetros y espesores de acuerdo con las normas a menos que se especifique lo contrario. Tolerancia: $\pm 5\%$

ABB MEASUREMENT & ANALYTICS | DATA SHEET | DS/FET400-EN REV. G

AquaMaster4 FEW4 and FET4

Electromagnetic flowmeter



Measurement made easy

The ideal flowmeter for potable water distribution networks, revenue metering and irrigation applications

Multiple measurement parameters

- flow rate, flow velocity, volume flow (forward, reverse and net) and pressure (option)

Integrated mobile communications

- NB-IoT (LTE Cat NB1 for China) & 4G LTE Cat1 with fall back to 3G

Multiple power options

- battery (with up to 10 years' life), renewable and AC mains

Wide range of sensor styles and size

- reduced bore DN40 to 600, virtual full bore DN40 to 200, full bore DN250 to 2400 and probe 300 to 1000 mm

Ideal for arduous applications

- IP68 for submersion up to 10 m that are prone to flooding and up to 5 m buriable

Verification

- in-situ diagnostics and self-checking capabilities to OIML type P

Flexible communications

- pulse, Modbus™ and Sensus™ with NFC interface to mobile smartphone/tablet

Diverse data options for mobile communications

- CSV/JSON files exchange through explicit FTPS/FTP (TLS1.2-based encryption) or MQTTS/MQTT Sparkplug B for 4G/3G and data exchange through LwM2m (over CoAP with DTLS 1.2 encryption) for NB-IoT (China Telecom IoT Platform)

Product is certified to NSF/ANSI/CAN 61-G, OIML R49:2013 & MID

Applications

- Water supply in district/zonal metering area
- Revenue metering
- Leak monitoring in district/zonal metering area
- Survey and flow investigation
- Irrigation and abstraction
- Fire suppression systems

Additional product features

- In-situ diagnostics and optional self-checking capabilities with OIML R49 type P (Approval pending for FEX45X)
- High and low flowrate alarms
- Backward compatible with legacy AquaMaster sensors
- Drinking water certifications: WRAS, NSF-61, ACS, AS/NZS 4020
- Certificates: OIML R49:2013, MID MI-001, NMI 10, PAC and UL 327 B
- Wireless certification: CE-RED, FCC/IC, PTCRB, SRRC

Values to you

- Solution from the masters of flow measurement – in 1988, ABB invented and designed the world's first battery-powered electromagnetic flowmeter for DMA (District Metered Area)
- Invest smartly through 'single box' DMA solution – combining measurement (flow & pressure), data logging and mobile communications
- Have greatest confidence in your billing based on highest accuracy with widest flow range revenue meter
- Get early warnings for leaks or bursts and reduce NRW (Non-Revenue Water) – highest confidence in night line performance
- Have highest confidence in the wet calibration – our flow rigs are certified by various national independent accredited bodies/laboratories all linked by the 'International Laboratory Accreditation Cooperation' (ILAC)
- Frequent granular data of process (flow rates and totalizer) and diagnostic parameters help to reduce operational cost or eliminate energy wastage and will enable you to control your supply and demand more accurately
- Get data at a higher resolution for precise and specific periods of interest anytime and every time
- Cyber Security assurance for data confidentiality and integrity including changes made in configuration settings or firmware upgrades with complete traceability which could be requested over air in near real time
- Fit-and-flow with factory default settings. Use the ABB Velox Interface mobile smartphone/tablet app to easily change configuration/settings to your preference
- Lowest total cost of ownership (TOTEX) over complete product lifecycle
- Maximum confidence in the health of the flowmeter through the use of ABB's SRV500 in-situ verification tool

Overview

FEX41X/FEX43X

Multiple power options



2 x internal batteries
(up to 10 years life)



Solar



Wind



AC mains

Interactive phone/tablet app – simple and easy



Secured and easy



Contactless



Chart and retrieve data



Offline configuration

Google Play™
Easy firmware update

Configurable features



In-built logger



Pressure measurement



Self-checking



Communications options



Pulse output



Modbus



Sensus protocol

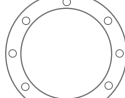
Multiple sensor options



Reduced bore
DN40 to 600



Virtual full bore
DN40 to 200



Full bore
DN250 to 2400



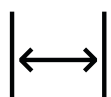
Probe
300 to 1000 mm



Measurement performance



Accuracy
up to $\pm 0.2\%$
 ± 0.5 mm/s
whichever is greater



Range (R)
up to R1000

Drinking water approvals

NSF-61 | WRAS | AS/NZS 4020 |
DVGW | ACS | D.M. 174

Wide environmental conditions



IP68 to 10 m
and up to 5 m
variable



-20 to 60 °C

Comparable to DIN ISO 12944
Corrosion resistance

Product type approvals

OIML R49:2013 for accuracy class 1
and 2 | MID MI-001 | NMI 10 | PAC

Calibration rig approvals

ISO 17025 | UKAS | NATA | SIMT
| NIST traceable | NABL

FEX45X**Multiple power options**

6 x internal
batteries
(up to 8
years life)



Solar



Wind



AC mains

Interactive phone/tablet app – simple and easy

Secured and
easy



Contactless



Chart and
retrieve data



Offline
configuration

**Google
Play**
Easy
firmware
update

Configurable features

In-built
logger



Pressure
measurement



Self-checking

Communications options

Pulse output



Modbus



4G/
nB - IoT

Data options

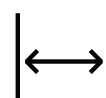
FTPS/MQTTs
with
Sparkplug B



CSV/JSON

Measurement performance

Accuracy
up to $\pm 0.2\%$
 $\pm 0.5\text{ mm/s}$
whichever
is greater



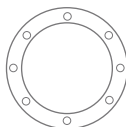
Range (R)
up to R1000

Multiple sensor options

Reduced
bore
DN40 to
600



Virtual full
bore
DN40 to
200



Full
bore
DN250
to 2400



Probe
300 to
1000 mm

**Drinking water approvals**

NSF-61 | WRAS | AS/NZS 4020 |
DVGW | ACS | D.M. 174

Wide environmental conditions

IP68 to IP10
and up to 5 m
buriable



-20 to $60\text{ }^{\circ}\text{C}$

**Comparable
to
DIN
ISO 12944**
Corrosion
resistance

Product type approvals

OIML R49:2013 for accuracy class 1
and 2 | MID MI-001 | NMI 10 | PAC

...Overview

Why is AquaMaster4 your first choice for distribution networks and revenue metering applications?

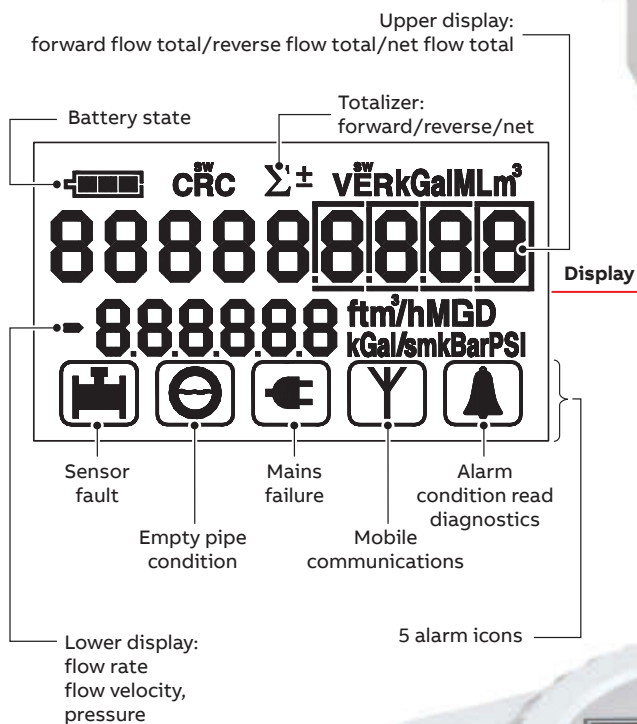
Your challenge	Our offering	Advantages for you
Do you have confidence in your revenue meter and therefore in your water balance table? 	AquaMaster4 offers highest accuracy with a wide flow range. Our OD upstream and downstream reduced bore sensor is virtually insensitive to hydraulic disturbances as it conditions the upstream fluid flow profile within the sensor's central measuring zone giving superior performance; especially during the night when the flow rate is low. The AquaMaster4's in-built optional cellular engine and data logger runs at high speed, logging at a fast rate giving the user total flexibility to download (typically 15 minutes) logged data; then investigate, in precise detail, flow and pressure activity during a period of interest at even higher time resolution. Such high resolution data facilitates step testing, leakage detection, water network analysis, reduces operational expenses and eliminates energy wastage. The in-built logger delivers accuracies which are not possible when using an external data logger.	Increase in revenue for authorized water consumption and early warnings on leaks (non-revenue water) 
Do you want to reduce the cost for commissioning and interacting with the product? 	A free app (Velox Interface) is available for use with Android™ smartphones and tablets. This supports simple configuration changes to made on your touchscreen color phone/tablet. Just touch to upload, then configure offline, touch again to update the AquaMaster4 configuration. The logger contents can be downloaded as a file in industry-standard CSV format in the same manner. To ensure the product remains up-to-date with the latest features and enhancements, the firmware is updated using the Velox Interface app. 'Fit-and-Flow' data storage inside AquaMaster4 eliminates the need to match a remote sensor with a transmitter in the field. On initial installation, the self-configuration sequence replicates all calibration factors, meter size and serial numbers, together with customer site-specific settings, into the transmitter automatically, eliminating the opportunity for error.	Increase productivity of your staff/contractor and eliminate poor quality through human error 
Do you want to have the lowest operational expenditure throughout the lifecycle of the product? 	Using standard off-the-shelf 'D' lithium cells, the AquaMaster4 can be operated for up to 10 years. Using a simple DC (6 to 32 V) connection from sources as small as a 5 W solar panel/wind generator, AquaMaster4 can be operated with green energy sources. There is no longer any need for bespoke cables and laptops to connect to each transmitter. In-situ self checking of flowmeter health enables the user to meet regulatory/technical requirements. In 1995, ABB invented and designed the world's first in-situ verification system for electromagnetic flowmeters. Building on ABB's fingerprint philosophy, each flowmeter is verification tested before shipping from the factory. SRV500 enables the operator to choose whether to either use the factory fingerprint or, after product commissioning, to create a new fingerprint based on real site conditions.	Lower cost of ownership  Simplifies compliance to ISO 9001 traceability without any additional effort 

FEX41X / FEX43X**Protective cover with wire to the contactless coupler**

The removable cover protects the transmitter display from accidental impact damage

**Wall mount contactless coupler**

The wall mount coupler allows users to communicate easily using a mobile phone/tablet when the transmitter is located in inaccessible places (for example, a pit)

**Contactless communication**

Interacting with the transmitter is easily achieved with an Android smartphone/tablet over NFC

**IP68 connectors**

IP68 rated as standard, the transmitter can be fully submerged for up to 2 meters

Anti-tamper seal

Secured against any tampering, meeting MID MI-001 regulations

Power supply enclosure

Enclosure for battery, AC or renewable power options

...Overview

FEX45X



NFC Cover with wire to the contactless coupler/USB

The removable cover enables contactless communication with USB termination or extension to wall mount contactless coupler



Wall mount contactless coupler

The wall mount coupler allows users to communicate easily using a mobile phone/tablet when the transmitter is located in inaccessible places (for example, a pit)

In-built data logger (optional)

Optional multi-speed, flowrate and pressure internal logger runs at high speed, allowing user to request logged data at any interval (typically set to one minute, but can be as fast as 15 seconds)

Contactless communication

AquaMaster4 is the first instrument to feature a contactless interface using industry standard Near Field Communication (NFC). A free App (Velox) available for use with Android and Windows smartphones and tablets supports simple configuration changes to be made on your touchscreen color phone/tablet.



Wireless communication

In-built cellular engine (4G/nB- IoT) sends logged data of measurement along with changes in configuration settings either as summary report or in reply to ad hoc requests with alarm notification for diagnostics

Fit and flow

No need to match sensor and transmitter, as the sensor stores all calibration factors, site settings and serial numbers

Power options

Plug-in external power supply unit (PSU) with option to select Battery/AC Main/Solar or Wind which is a 3.6 V DC interface only. Integral flowmeters are powered with internal batteries.

IP68 connectors

IP68 rated as standard, the transmitter can be fully submerged for up to 2 meters

Range of flange options

ISO 7005, DIN, EN 1092-1 PN10/PN16 / PN25/PN40
 ANSI/ASME B16.5/16.47 series B
 Class 150/Class 300
 AWWA C207 Class B/D/E
 AS 4087 PN16
 AS2129 Table E
 JIS 7.5K/10K/5K

EN ISO 12944 C4 grade comparable corrosion resistance

Zinc-based primed with $\approx 70 \mu\text{m}$ (optional $300 \mu\text{m}$) thick paint coat will give long lasting corrosion resistance even in arduous applications

IP68, NEMA 6P

All sensor types are, as standard, inherently submersible thus ensuring suitability for installation in chambers and metering pits that are prone to flooding

Sensor memory

The sensor stores all calibration factors, site settings and serial numbers enabling users to fit-and-flow

Drinking water approvals

NSF-61 | WRAS | AS/NZS 4020 | DVGW | ACS | D.M. 174

Upstream and downstream pipe length

Reduced bore DN40 to 600 requires 0D upstream and downstream
 Virtual full bore DN40 to 200 requires 5D upstream and 0D downstream (0D upstream and 0D downstream to OIML R49:2013 only)
 Full bore DN250 to 2400 requires 5D upstream and 2D downstream (3D upstream and 0D downstream to OIML R49:2013 only)

Available in both integral and remote form

IP68, NEMA 6P

All sensor types are, as standard, inherently submersible thus ensuring suitability for installation in chambers and metering pits that are prone to flooding

Sensor memory

The sensor stores all calibration factors, site settings and serial numbers enabling users to fit-and-flow

Material selected to last

The sensor body material enables it to be used in rugged applications

Hot tap capability

The sensor construction enables installation with no interruption to water supply

Drinking water approvals

NSF-61 | WRAS | ACS

Calibration in ABB flow laboratory



Figure 1 ABB calibration rig – certificated by ISO, UKAS, NATA, SIMT and NIST traceable

ABB's flow calibration facilities are certified by various national independent accredited bodies/laboratories and these are all linked by the 'International Laboratory Accreditation Cooperation' (ILAC7).

Flowmeters in ABB's facilities can be calibrated by one of the following methods:

- gravimetric (using weigh scales)
- volumetric (using the meter prover)
- comparison (using reference meters)

Additionally, ABB's laboratories are checked against each other and against external accredited laboratories using transfer standard meters.

Gravimetric

In this method, the flowmeter is calibrated in a pipeline, with water being pumped through it from a sump. A diverter valve situated downstream directs the flow from the meter either back to the sump or to a tank of sufficient capacity attached to a highly accurate weighing system.

Volumetric

There are two main methods of volumetric calibration:

- Fixed volume volumetric tank method
 - This method works in a similar way to the gravimetric method, except that the flow from the meter is diverted into a tank of known volumetric capacity. This eliminates the need for a weighing system or to calculate the volume of water from its weight.

- Fixed volume ball meter prover

- In this method, the diverter valve directs the flow from the meter into a meter prover. The prover is a precisely manufactured section of pipe containing a sphere that is three percent larger in diameter than the pipe. Two detector switches are situated in the pipe at a fixed distance apart. The volume of water that is contained in the pipe between the switches is known as the calibrated volume.

–

Comparison

In this method, the flowmeter under calibration is installed in a pipeline in series with a reference, or master, flowmeter with a known calibration. Once the flow of water through both meters is stable, a timer is started and the outputs of both meters are simultaneously monitored. After a set period, the timer is stopped. Using the data from the calibration run enables the average flowrate of the meter under test to be compared with the master meter, with the difference being the error.

Advantages of ABB's calibration rig

ABB has one of the largest calibration facilities in the world, capable of pumping 2.5 m³/s, enabling larger meters to be calibrated at high flowrates.

All of ABB calibration facilities are continuously pumped enabling a flowmeter to be calibrated at a steady flowrate (for example, over 300 or 600 seconds; or longer if required), to reduce a meter's random uncertainty errors during calibration.

ABB's high turndown flowmeters (those with a high R number) can be calibrated over an extended flow range, guaranteeing accurate flowmeter performance over its full operating range.

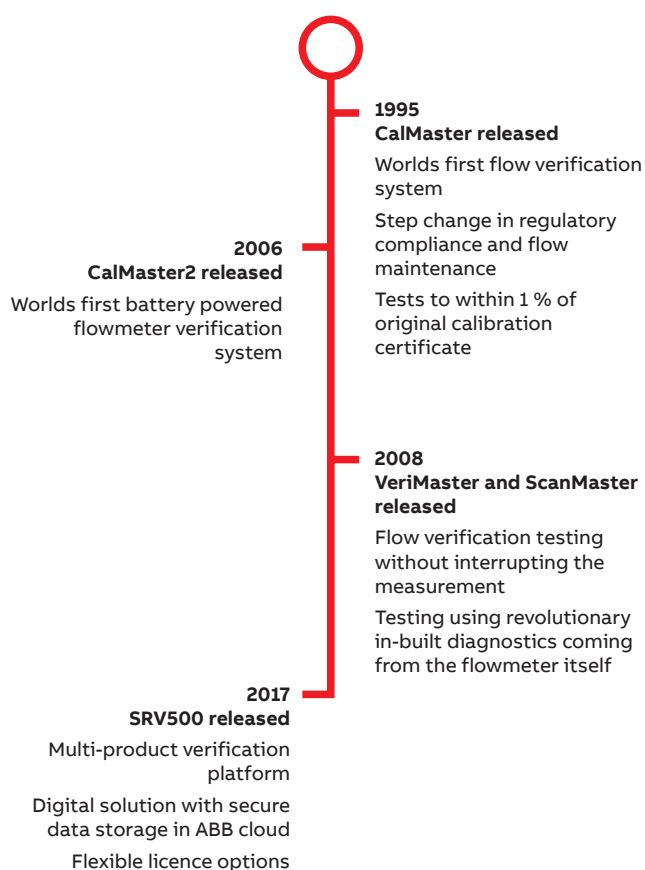
Verification

What is verification?

Verification is the inspection and testing of a product to establish that it meets regulatory/technical requirements. Industrial instrumentation is robust, very reliable and designed to operate for many years with minimal maintenance. In today's competitive environment customers are looking for ways to maximize their profitability, regular product verifications is one way to ensure processes continuously operate at their peak.

The ABB verification story

Customers in the water and process industries have been able to save large sums of money thanks to ABB's innovations in product verification over the last two decades.



Introducing SRV500

The next generation verification tool suite for use with ABB's complete range of active electronic flowmeters. Download the software for free and use the instrument-specific test routine to provide the best possible check of product health, without stopping your process.

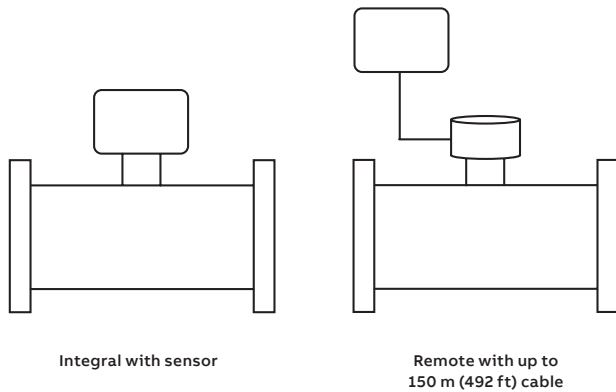
SRV500 verifies the condition and performance of the flowmeter under test. With the licensed software version, test reports can be generated and stored locally for further analysis. SRV500 also analyzes the product internal diagnostics and compares the results with historical measurements.

SRV500 enables the operator to choose whether to use either the factory fingerprint or to create a new fingerprint based on real site conditions after product commissioning. All verifications performed in the field can then be compared with the fingerprint data and previous tests to ensure flowmeter performance has not degraded.



Specification – transmitter (41X/43X)

Mounting on flow sensor



Power supply



Battery power

Only use 3.6 V lithium thionyl chloride D batteries recommended by ABB

Note. The following batteries work with the product:

- SAFT LS33600
- Eve ER34615
- GB Cell ER34615
- cT-energy ER34615
- OmniCel ER34615
- GEBC ER34615
- LiYa ER34615
- Fanzo ER34615H

The above batteries comply with the safety requirements of IEC60086-4, and have a maximum peak discharge current of less than 500mA.

Nominal battery life

Sensor style	Size	Integral mount transmitter	Remote mount transmitter
Reduced bore	DN40 to 80	10.5 years	8 years
	DN100 to 300	7 years	5.5 years
	DN350 to 600	6 years	5 years
Virtual full bore	DN40 to 200	10.5 years	8 years
Full bore	DN250 to 600	6 years	5 years
	DN700 to 2400	2.5 years	2 years
Probe	300 to 1000 mm	10.5 years	8 years

Test conditions:

- acquisition = 15 seconds
- pulse output = 2 Hz @ 5 ms
- alarm output on = 25 %
- logger rate = 1 minute
- with pressure
- integral verification self check = 15 minutes
- ambient temperature = 20 °C

Battery capacity and life are significantly shortened:

- when the operating environment temperature ranges between -20 and 0 °C or 50 and 70 °C (-4° and 32 °F or 122 and 158 °F)
- when data acquisition is less than 15 seconds
- when pulse output width > 5 ms and output frequency is set high
- with extended NFC interface use
- Class 2/Class 1 calibration to OIML R49 & MID options (CM2 & CM1 in ordering code)
- when Modbus or Sensus output is in use

Mains supply (option – remote only)

- 95 to 240 V AC, 50/60 Hz, 3 VA
- Mains connection cable: approx. 3 m (9.8 ft)

Internal backup power time for:

- DN40 to 200: 16 days
- DN250 to 600: 6 days
- DN700 to 2400: 3 days

Renewable power (option)

- Solar or wind
- Input voltage: 6 to 32 V DC @ 5 W
- Max. current: 200 mA

Internal backup time for:

- DN40 to 200: 48 days
- DN250 to 600: 18 days
- DN700 to 2400: 9 days

Note. Renewable energy generators do not operate at maximum capacity. For example, low wind speeds, dirty solar panels and shorter daylight periods all reduce capacity. Consequently, some installations may require generators with a capacity greater than the specified 5 W minimum.

Inputs

- IP68 connectors, mains cable (remote only)
- Sensor cable (remote only). ABB sensor cable supplied as standard. SWA cable available (via adapter box) on application
- Pressure transducer connection (option)

Configuration/User interface

ABB Velox Interface app on a compatible tablet or smartphone. Operating systems of smartphone or tablet are Android (Oreo or newer). Functions of Velox Interface include configuration, diagnostics, logger data retrieval and transmitter flash update.

Outputs

- Pulse/Alarm
- RS485 Modbus
- Sensus protocol

Pulse outputs (option)

- Passive Output 1: forward pulses
- Passive Output 2: reverse pulses
- +35 V @ 20 mA solid state, unipolar
- Isolated with one common, shared with alarm output max. ± 50 V to earth
- 50 Hz max., programmable pulse width, default 2 ms *

* Increasing pulse width beyond 2 ms at frequencies greater than 10 Hz reduces battery life

Modbus interface (option)

- Modbus RTU over 2-wire EIA-485
- Supported baud rates: 9600 and 19200
- Max. devices on bus segment: 32
- Max. response time, 1 registered read: 60 ms
- Max. response time, 1 registered write: 600 ms

Alarm outputs (option)

- Indicates any problem with measurement, power supply or flowrate alarm
- Bi-directional, solid state
- +35 V @ 50 mA
- Isolated with one common, shared with pulse outputs

Automatic meter reading (AMR)

3-wire Sensus compatible

Logger

Logger function	Flow and pressure	Forward, reverse, and net flow totals
No. of records	45871	3120
Logging interval *	15 seconds 30 seconds 1 minute 5 minutes 15 minutes (selectable)	24 hours (fixed)
Logger capacity	31 days @ 1 minute 477 days @ 15 minutes	8 years

* Based on a default 15 second measurement rate when operating on battery or renewable power

Retrieval of logger data file via smartphone/tablet – see

Configuration/User interface on page 12

Logger data file format

- .csv for easy import into databases/spreadsheets
- Time-stamped records with flow, pressure and totalizers in user-configured units of measurement

Response time (programmable)

- >0.1 second (mains-powered)
- 15 seconds (battery-powered + external renewable energy)

Environmental and operating conditions

Ingress rating

IP68 (NEMA 6P), <2 m (6 ft)

Submerged

9 months accrued time

Humidity

0 to 100 %

Temperature ranges

Storage: -20 to 60 °C (-4 to 140 °F)

Ambient: -25 to 60 °C (-13 to 140 °F)

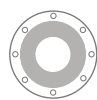
Transmitter vibration

IEC 60068-2-6 (2007)

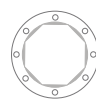
Vibration level 2g

Options

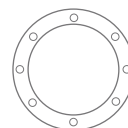
Compatible sensor styles



Reduced
bore
DN40 to
600



Virtual full
bore
DN40 to
200



Full
bore
DN250 to
2400



Probe
300 to
1000 mm

External pressure transducer (option)

Up to 20 and 40 bar absolute

Backward compatibility (option)

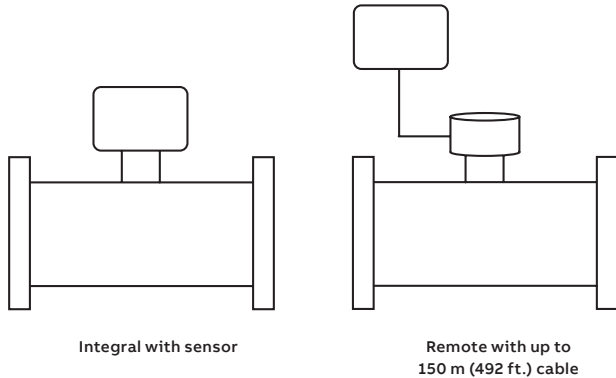
- Full compatibility with legacy AquaMaster remote sensors. Plugs directly into AquaMaster4 with no specific configuration required.

MID/Tamper detection (option)

- Switch selectable inside the tamper-evident, seal-protected enclosure
- Prevents changes to meter configuration that affect the meter/output accuracy

Specification– transmitter (FEX45X)

Mounting on flow sensor



Power supply



Battery

AC mains

Solar

Wind

Battery power

6/4 lithium thionyl chloride 'D' batteries.

Note. The following batteries work with the product:

- SAFT LS33600 *
- Eve ER34615 *
- GB Battery ER34615
- cT-energy ER34615
- OmniCel ER34615
- GEBC ER34615
- LiYa ER34615
- Fanzo ER34615H

* Preferred

Nominal External Battery Power Supply Unit (PSU) only: FTPS/FTP

Sensor style	Size	Integral	Remote
Reduced bore	DN40 to 80	8.5 years	7 years
	DN100 to 300	7 years	6.5 years
	DN350 to 600	7 years	6 years
Octagonal bore	DN40 to 200	8.5 years	7 years
Full bore	DN250 to 600	7 years	6 years
	DN700 to 2400	4 years	4 years

MQTTS/MQTT with Sparkplug B

Sensor style	Size	Integral	Remote
Reduced bore	DN40 to 80	11 years	9 years
	DN100 to 300	9 years	7.5 years
	DN350 to 600	8.5 years	7.5 years
Octagonal bore	DN40 to 200	11 years	9 years
Full bore	DN250 to 600	8.5 years	7.5 years
	DN700 to 2400	4.5 years	4 years

Test conditions:

- acquisition = 15 seconds
- pulse output = 2 Hz @ 5 ms
- alarm output on = 25 %
- logger rate = 1 minute
- with pressure
- integral verification self check = 15 minutes
- ambient temperature = 20 °C
- mobile communication transmission interval of:
 - 24 h for Detailed Report through 4G over FTPS/FTP/MQTTS/MQTT with Sparkplug B, or- 6 h for Summary Report through NB - IoT over LwM2M
- Battery capacity and life are significantly shortened:
 - when the operating environment temperature ranges between -20 and 0 °C or 50 and 70 °C (-4° and 32 °F or 122 and 158 °F)

- when data acquisition is less than 15 seconds
- when pulse output width > 5 ms and output frequency is set high
- with extended NFC interface use
- Class 2/Class 1 calibration to OIML R49 & MID options (CM2 & CM1 in ordering code)
- when Modbus output is in use
- with extended use of mobile communications

Mains supply (option – remote only)

- 95 to 240 V AC, 50/60 Hz, 3 VA
- Mains connection cable: approx. 3 m (9.8 ft)

Renewable power (option)

- Solar or wind
- Input voltage: 6 to 32 V DC @ 5 W
- Max. current: 200 mA

Internal backup time for:

- DN40 to 200: 5 days
- DN250 to 600: 3 days
- DN700 to 2400: 1 day

Note. Renewable energy generators do not operate at maximum capacity. For example, low wind speeds, dirty solar panels and shorter daylight periods all reduce capacity. Consequently, some installations may require generators with a capacity greater than the specified 5 W minimum.

Nominal External Backup Power for Mains and Renewable Power Supply Unit (PSU) FTPS/FTP:

Sensor style	Size	Integral	Remote
Reduced bore	DN40 to 80	5.5 years	5 years
	DN100 to 300	5 years	4 years
	DN350 to 600	4.5 years	4 years
Octagonal bore	DN40 to 200	5.5 years	5 years
Full bore	DN250 to 600	4.5 years	4 years
	DN700 to 2400	2.5 years	2.5 years

Note. Test conditions are the same as for battery-operated transmitter with 4 batteries only.

MQTTS/MQTT with Sparkplug B

Sensor style	Size	Integral	Remote
Reduced bore	DN40 to 80	6.5 years	5 years
	DN100 to 300	5.5 years	4.5 years
	DN350 to 600	5 years	4.5 years
Octagonal bore	DN40 to 200	6.5 years	5.5 years
Full bore	DN250 to 600	5 years	4.5 years
	DN700 to 2400	3 years	3 years

Battery change-over backup time

- Approximately 2 minutes

Antenna

- Internal
- External (option)

Note. Mobile communications do not operate if the internal antenna is under water. The general advice is to mount the antenna as high as possible, always outside of any metal enclosures and not under the surface of the ground.

Inputs

- IP68 connectors, mains cable (remote only)
- Sensor cable (remote only). ABB sensor cable supplied as standard. SWA cable available (via adapter box) on application
- Pressure transducer connection (option)

Configuration/User interface

ABB Velox Interface app on a compatible tablet or smartphone. Operating systems of smartphone or tablet are Android (Oreo or newer). Functions of Velox Interface include configuration, diagnostics, logger data retrieval and transmitter flash update.



IMPORTANT (NOTE)

Please ensure all required regulatory approvals are in place before you put the FEX45X transmitter in use.

Outputs

- Pulse/Alarm
- RS485 Modbus
- Mobile communications (4G fall back to 3G/NB-IoT)

Pulse outputs (option)

- Passive Output 1: forward pulses
- Passive Output 2: reverse pulses
- +35 V @ 20 mA solid state, unipolar
- Isolated with one common, shared with alarm output
Max ±50 V to earth
- 50 Hz max., programmable pulse width, default 2 ms*

* Increasing pulse width beyond 2 ms at frequencies greater than 10 Hz reduces battery life

Modbus interface (option)

- Modbus RTU over 2-wire EIA-485
- Supported baud rates: 9600 and 19200
- Max. devices on bus segment: 32
- Max. response time, 1 registered read: 60 ms
- Max. response time, 1 registered write: 600 ms

Alarm outputs (option)

- Indicates any problem with measurement, power supply or flowrate alarm
- Bi-directional, solid state
- +35 V @ 50 mA
- Isolated with one common, shared with pulse outputs

Mobile communications – 4G/3G

- 4G LTE Cat1 with fall back to 3G (HSPA/HSPA+)
- Data exchange via FTPS/FTP or MQTTS/MQTT Sparkplug B (V 3.0.0) (TLS1.2 encryption with digital certificate based mutual authentication) protocol
- Data exchange format configurable to CSV/JSON
- Data exchange interval, 15 mins, 30 mins, 1 hour, 2 hours, 4 hours, 6 hours, 8 hours, 12 hours or 24 hours configurable

Mobile communications – NB – IoT

- NB – IoT over China Telecom
- Data exchange via LwM2M (DTLS 1.2 encryption)
- Data exchange format JSON (JavaScript Object Notation) for China Telecom
- Data exchange interval 1 hour, 6 hours, 12 hours or 24 hours configurable

Logger

Logger function	Flow, pressure, forward, reverse, and net flow totals
No. of records	45792
Logging interval *	15 seconds 30 seconds 1 minute 5 minutes 15 minutes (selectable)
Logger capacity	31 days @ 1 minute 477 days @ 15 minutes

* Based on a default 15 second measurement rate when operating on battery or renewable power

Logger data file format

- .csv for easy import into databases/spreadsheets
- Time-stamped records with flow, pressure and totalizers in user-configured units of measurement

Audit logger

- Time-stamped records for all events, such as configuration changes, diagnostics, regular alarms and critical alarms (firmware update, change of totalizer, roll over of totalizer, reset of totalizer).

- stored as standard (3000 records) and critical (1000 records) events in separate database.
- available as .csv for easy import into databases/spreadsheets

Response time (programmable)

>0.1 second (mains-powered)

15 seconds (battery-powered + external renewable energy)

Report types in mobile communications

- Summary report with totalizer (fwd., reverse and net), flow rate, alarm status (OK/Not OK), signal quality, and battery life along with Pressure
- Detail report with totalizer (fwd., reverse, and net), flow rate, pressure log, alarm, signal quality, battery life
- Diagnostic alarm report

Remote requests through mobile communications

- Summary report, detail report, and audit log report
- Firmware update
- Configuration changes
- Device Certificate update

...Specification – transmitter (FEX45X)

Environmental and operating conditions

Ingress rating

IP68 (NEMA 6P), <2m (6 ft.), for 360 hours (Tested according to IEC 60529)

Humidity

0 to 100 %

Temperature ranges

Storage: -20 to 60 °C (-4 to 140 °F)

Ambient: -25 to 60 °C (-13 to 140 °F)

Environmental classification

O, M1 and E2 for internal antenna devices & E1 for external antenna devices

Transmitter vibration

IEC 60068-2-6 (2007)

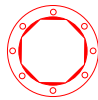
Vibration level 2g

Options

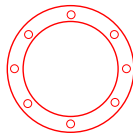
Compatible sensor styles



Reduced bore
DN40 to 600



Octagonal bore
DN40 to 200



Full bore
DN250 to 2400

External pressure transducer (option)

Up to 20 and 40 bar absolute

Backward compatibility (option)

- Full compatibility with legacy AquaMaster remote sensors. Plugs directly into AquaMaster 4 with no specific configuration required. Note the transmitter is not compatible with legacy telemetry applications and software applications

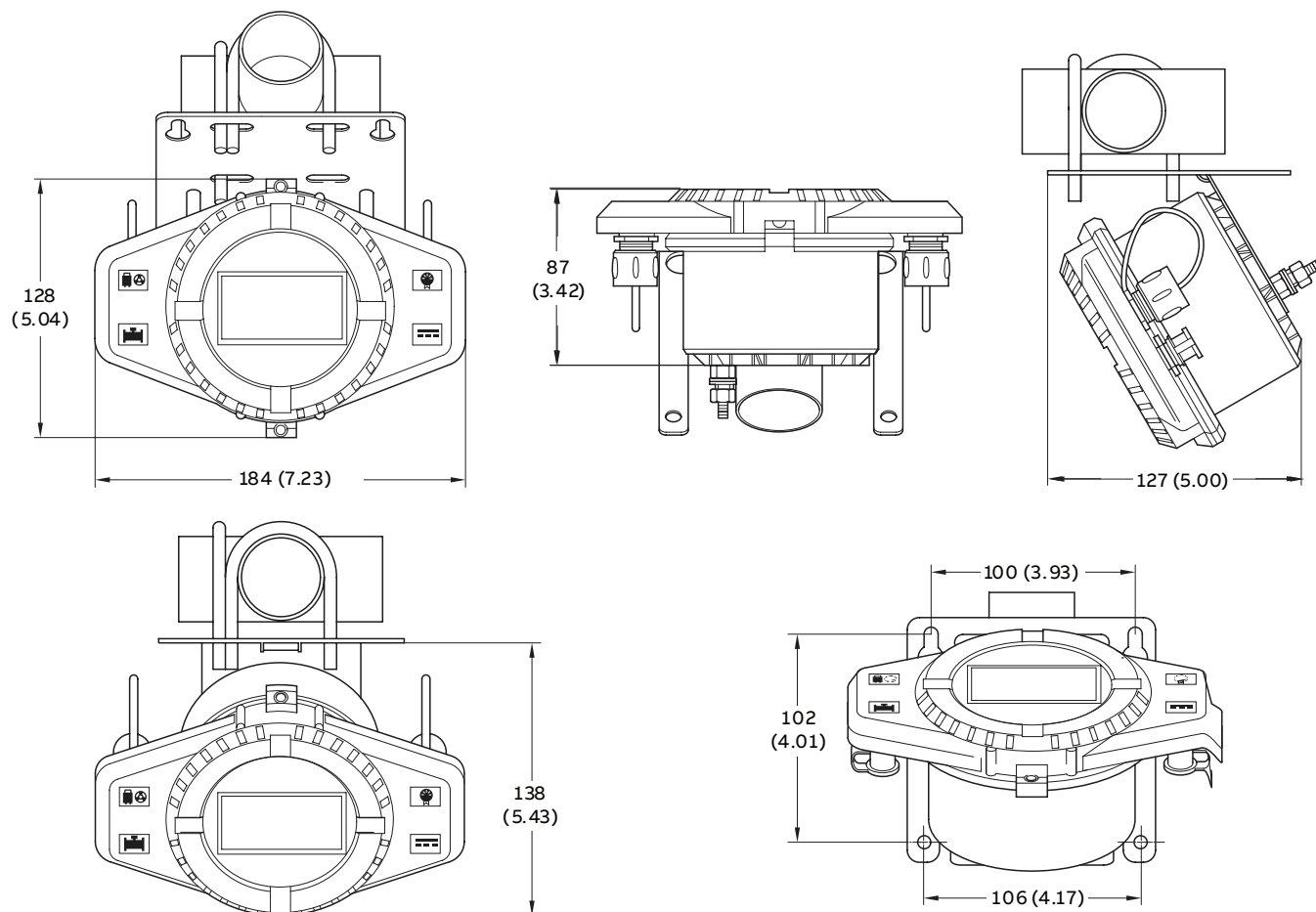
Read-only switch

- Switch selectable inside the SIM card chamber
- Prevents changes to meter configuration that affect the meter/output accuracy

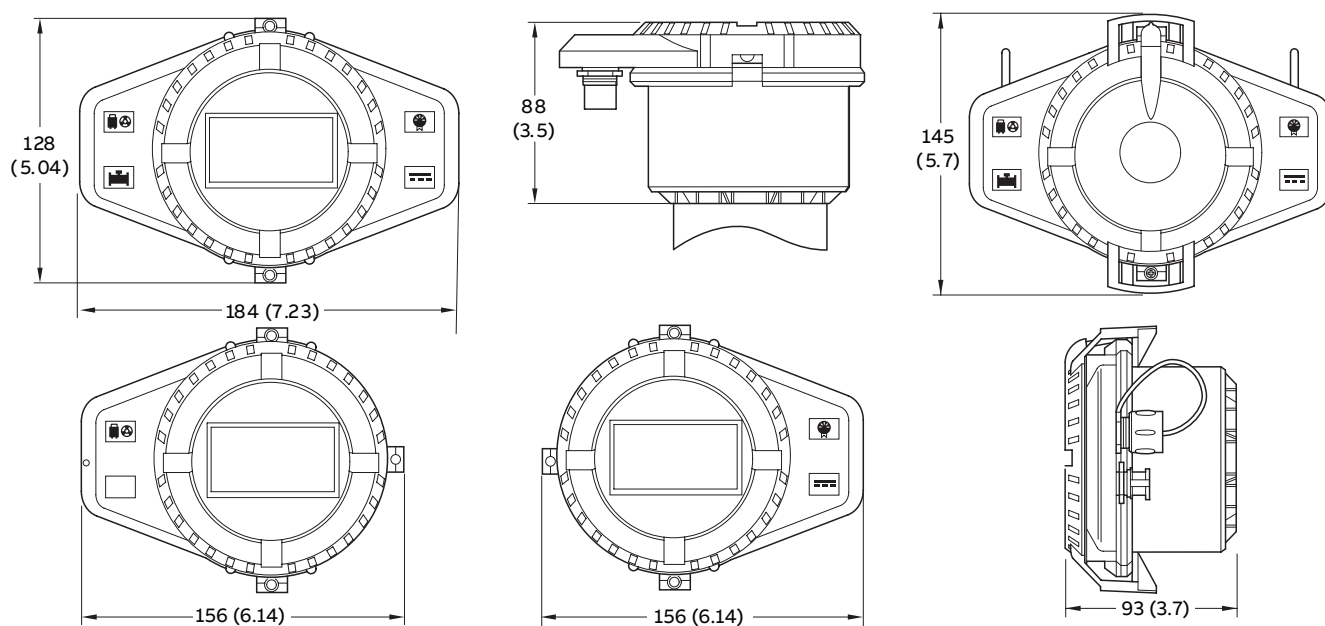
Specification

Dimensions – transmitter (41X/43X)

Dimensions in mm (in)



Wall-/Pipe-mount remote transmitter



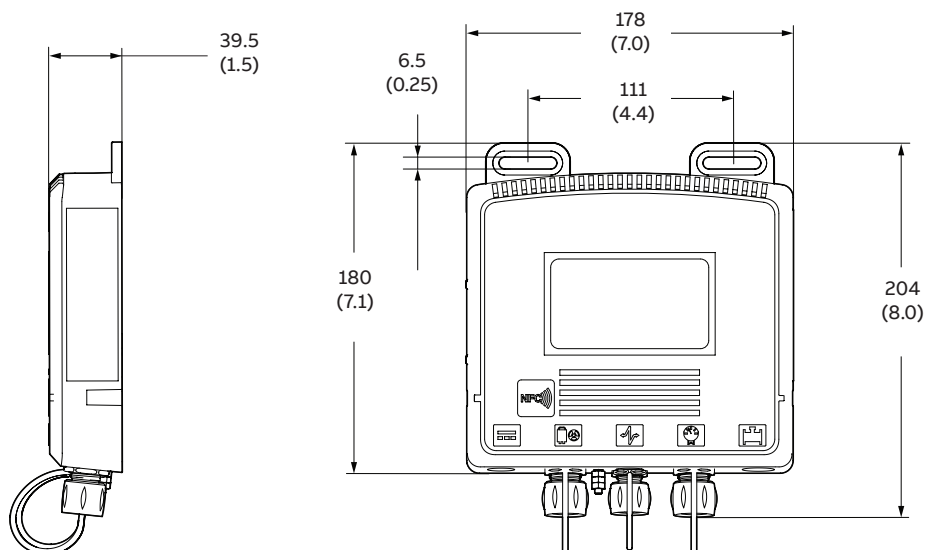
Integral transmitter

Transmitter with NFC aerial cover

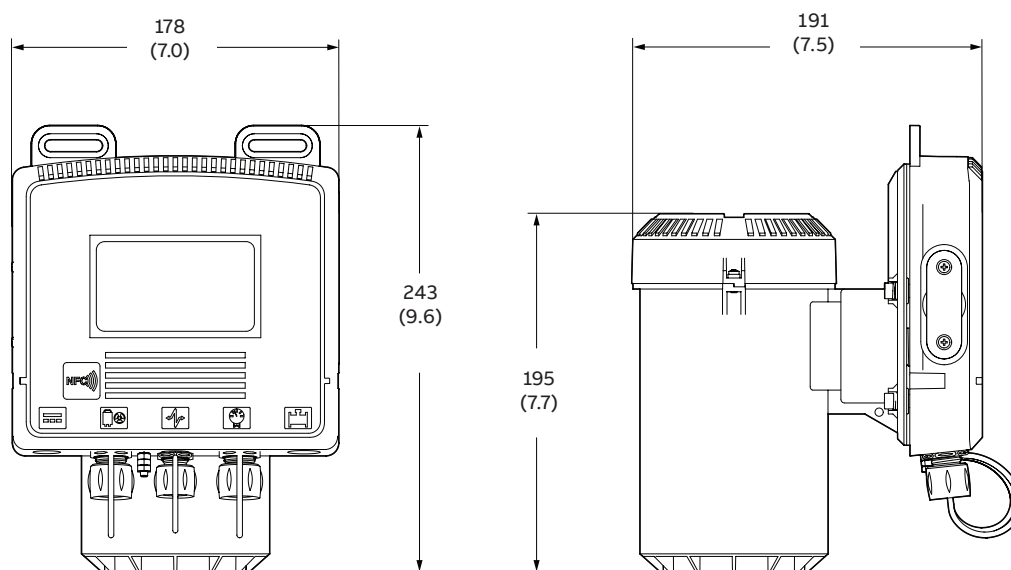
...Specification

Dimensions – FET450

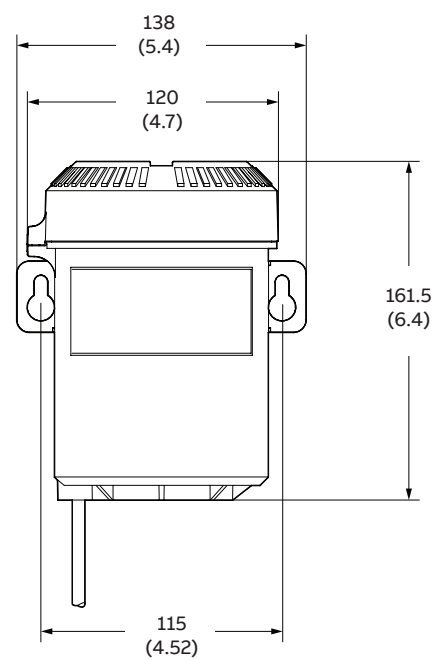
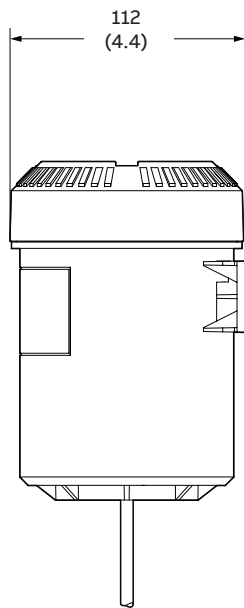
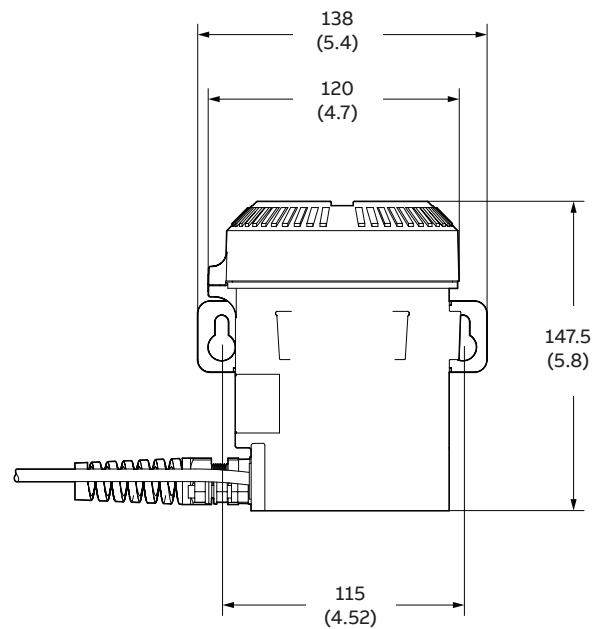
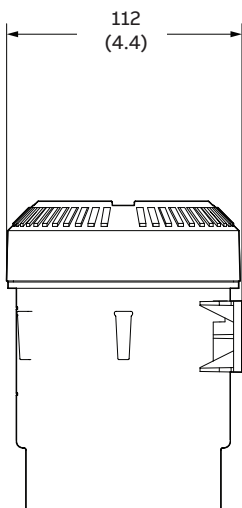
Dimensions in mm (in)



Wall-/Pipe-mount remote transmitter

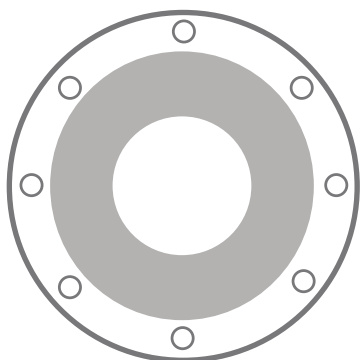


Integral transmitter

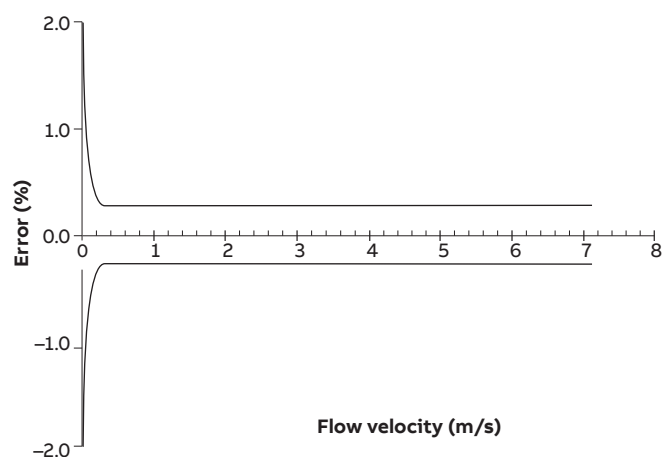
Dimensions – Power supply unit for FET452**Battery power supply unit (PSU)****Mains/renewable power supply unit (PSU)**

...Specification

Reduced bore sensor



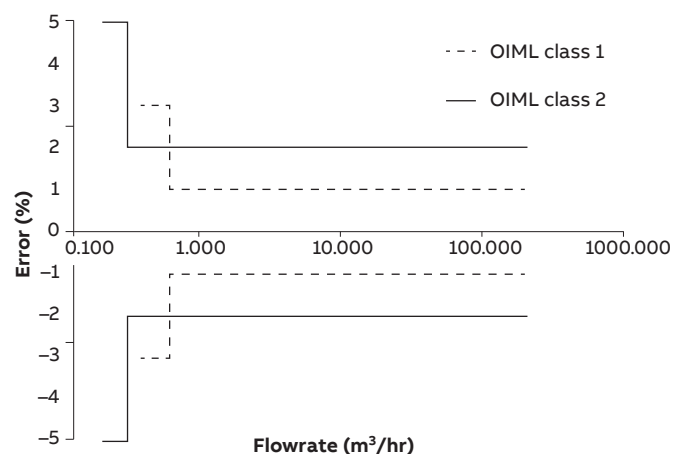
Measurement accuracy



DN	Mains powered		Battery/Renewable energy powered	
	Class 2 ±0.5 or ±0.4 %	Class 1 ±0.2 %	Class 2 ±0.5 or ±0.4 %	Class 1 ±0.2 %
40 to 600	±1 mm/s *	±0.5 mm/s *	±2 mm/s *	±1 mm/s *

* Whichever is the greater

Metrological performance to OIML R49:2013



DN	in	Q3 (m³/h)	Mains powered		Battery/Renewable energy powered	
			Class 2 (R = 1000)	Class 1 (R = 500)	Class 2 (R = 400)	Class 1 (R = 160)
			Q1 (m³/h)	Q1 (m³/h)	Q1 (m³/h)	Q1 (m³/h)
40	1½	25	0.025	0.05	0.063	0.16
50	2	40	0.04	0.08	0.10	0.25
65	2½	63	0.063	0.13	0.16	0.39
80	3	100	0.10	0.20	0.25	0.63
100	4	160	0.16	0.32	0.40	1
125	5	160	0.16	0.32	0.40	1
150	6	400	0.40	0.80	1	2.50
200	8	630	0.63	1.26	1.58	3.94
250	10	1000	1	2	2.50	6.25
300	12	1600	1.60	3.20	4	10
350	14	1600	1.60	3.20	4	10
400	16	2500	2.50	5	6.25	15.63
450	18	2500	2.50	5	6.25	15.63
500	20	4000	4	8	10	25
600	24	6300	6.30	12.60	15.75	39.38

$$Q2 = 1.6 * Q1$$

$$Q4 = 1.25 * Q3$$

$$Q3/Q1 = R$$

DN	in	Q3 (US gal/min)	Mains powered		Battery/Renewable energy powered	
			Class 2 (R = 1000)	Class 1 (R = 500)	Class 2 (R = 400)	Class 1 (R = 160)
			Q1 (US gal/min)	Q1 (US gal/min)	Q1 (US gal/min)	Q1 (US gal/min)
40	1½	110	0.11	0.22	0.28	0.69
50	2	176	0.18	0.35	0.44	1.10
65	2½	277	0.28	0.55	0.69	1.73
80	3	440	0.44	0.88	1.10	2.75
100	4	704	0.70	1	1.76	4.40
125	5	704	0.70	1	1.76	4.40
150	6	1761	1.76	3.52	4.40	11
200	8	2774	2.77	5.55	6.93	17.34
250	10	4403	4.40	8.81	11	27.52
300	12	7045	7	14	17.61	44
350	14	7045	7	14	17.61	44
400	16	11007	11	22	27.52	68.79
450	18	11007	11	22	27.52	68.79
500	20	17611	17.61	35.22	44	110
600	24	27738	27.7	55.5	69	173

$$Q2 = 1.6 * Q1$$

$$Q4 = 1.25 * Q3$$

$$Q3/Q1 = R$$

Bore sizes and flange types

Bore size range

DN40 to 600

Flanges to standards

ASME

AWWA

ISO 7005 EN1092-1

DIN

AS4087

AS2129

JIS

Pressure limitations for flanges

As per flange rating

PN25 max. process temperature 50 °C (122 °F)

PN40 max. process temperature 40 °C (104 °F)

Pressure equipment directive 97/23/EC

This product is applicable in networks for the supply, distribution and discharge of water and associated equipment and is therefore exempt.

Bore and flange material

- DN40 to 200: SG iron
- DN250 to 600: carbon steel
- All sizes (DN 40 - 600) coated with light gray 2-pack epoxy (RAL9002)
- Primer: Interpon PZ660 zinc-based system, 70 microns thick
- Top coat: Interpon 610 light gray polyester powder coating (RAL 9002), up to 150 microns thick, comparable to EN ISO 12944 grade C4
- As a special requirements: 2-pack epoxy primer/finish @ 300 µm DFT

Terminal box for remote sensors

Polycarbonate

Environmental and process conditions

Ingress rating

- IP68 (NEMA 6P) to 10 m (33 ft) for continuous submersion (Tested for 1500 hours according to IEC 60529)
- For buriable applications: 1 m < sensor depth ≤ 5 m

Temperature ranges

Ambient: -25 to 70 °C (-13 to 158 °F)

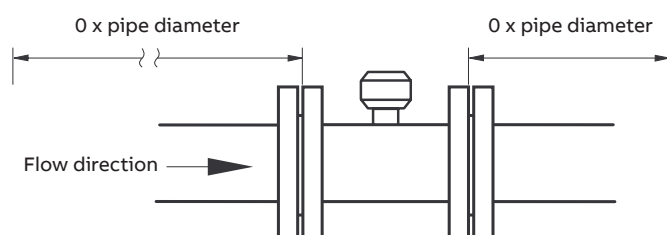
Process: -6 to 70 °C (21 to 158 °F)

Ambient (OIML R49): -25 to 55 °C (-13 to 131 °F)

Conductivity

>20 µS/cm

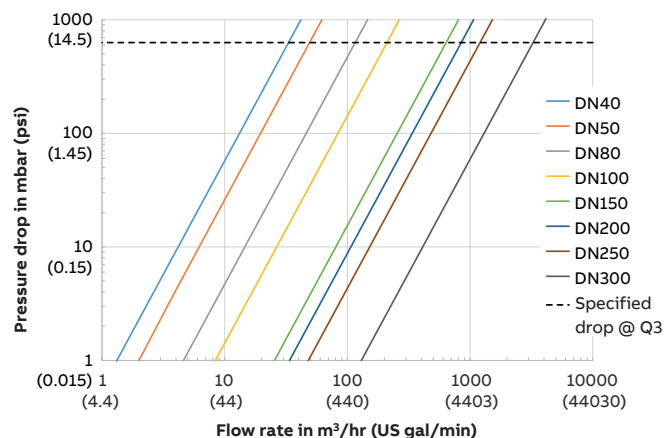
Upstream and downstream pipe conditions



Pressure loss

Flow rate	Pressure loss in bar (psi)
Q ₃	DN40 - 50 < 0.4 (5.8)
Q ₃	DN65 - 600 < 0.63 (9.1)
Q ₃ / 2	< 0.16 (2.3)

Reduced bore sensor pressure drop (typical)



Potable water approvals

WRAS*

ACS#

NSF – 61#

AZ/NZS 4020*

Approvals, certification and safety

NSF

Certified to NSF/ANSI/CAN 61-G



* Material approval

#Meter Approval

...Specification

...Reduced bore sensor

Metrological certifications

- OIML R49:2013 for accuracy class 1 and 2 and water temperature class T50 0.1 to 50 °C (32.18 to 122 °F)
- Environmental class: O, M1 ,E1** and E2*
- MID MI-001
- NMI 10 for Australia
- PAC for China

DN	in	Q3 (m ³ /h)	Mains powered			Battery/Renewable energy powered		
			Class 2.5 (R = 630)	Class 2 (R = 1000)	Class 1 (R = 500)	Class 2.5 (R = 250)	Class 2 (R = 400)	Class 1 (R = 160)
			Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)
40	1½	25	0.04	0.025	0.05	0.1	0.062	0.062 ⁽³⁾
50	2	40	0.063	0.04	0.08	0.16	0.1	0.1 ⁽³⁾
65	2½	63	0.1	0.063	0.063 ⁽²⁾	0.252	0.157	0.39
80	3	100	0.159	0.1	0.1 ⁽²⁾	0.4	0.25	0.625
100	4	160	0.254	0.16	0.32	0.64	0.4	1
125	5	160	0.254	0.16	0.32	0.64	0.4	1
150	6	400	0.63	0.4	0.4 ⁽²⁾	1.6	1	1 ⁽³⁾
200	8	630	1	0.63	0.63 ⁽²⁾	2.52	1.575	1.575 ⁽³⁾
250	10	1000	1.59	1	2	4	2.5	6.25
300	12	1600	2.54	1.6	3.2	6.4	4	10
350	14	1600	2.54	1.6	3.2	6.4	4	10
400	16	2500	7.94 ⁽⁷⁾	5 ⁽¹⁾	5	20 ⁽⁸⁾	12.5 ⁽⁴⁾	15.63
450	18	2500	7.94 ⁽⁷⁾	5 ⁽¹⁾	5	20 ⁽⁸⁾	12.5 ⁽⁴⁾	15.63
500	20	4000	6.35	4	8	63.5 ⁽⁹⁾	40 ⁽⁵⁾	100 ⁽⁶⁾
600	24	6300	10	6.3	12.6	100 ⁽⁹⁾	63 ⁽⁵⁾	157.5 ⁽⁶⁾

(1) R = 500, (2) R = 1000, (3) R = 400, (4) R = 200, (5) R = 100 (6) R = 40 (7) R = 315 (8) R = 125 (9) R = 63

Q2 = 1.6 * Q1

Q4 = 1.25 * Q3

Q3/Q1 = R

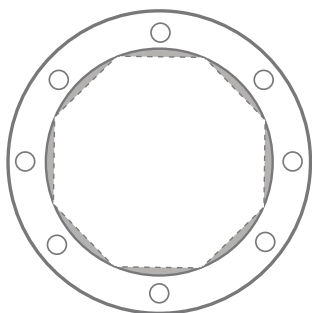
UL Fire Service approval (41X/43X)

Size	UL low flow GPM	UL high flow GPM	Pressure drop (psi)
2	6	235	≤ 10
2½	6.5	280	≤ 9
3	6	465	≤ 7
4	10	630	≤ 6
6	20	1780	≤ 4
8	20	3345	≤ 8
10	45	4450	≤ 6
12	85	5245	≤ 2

* Applicable only for internal antenna devices of FEX45X & all options of FEX43X

** Applicable for external antenna devices of FEX45X

Full bore sensor



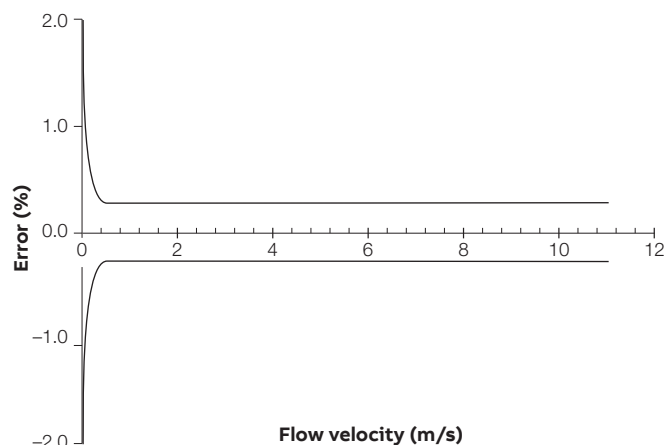
DN40 to 200

Virtual full bore, polypropylene liner

DN250 to 2400

Full bore, elastomer or hard rubber liner

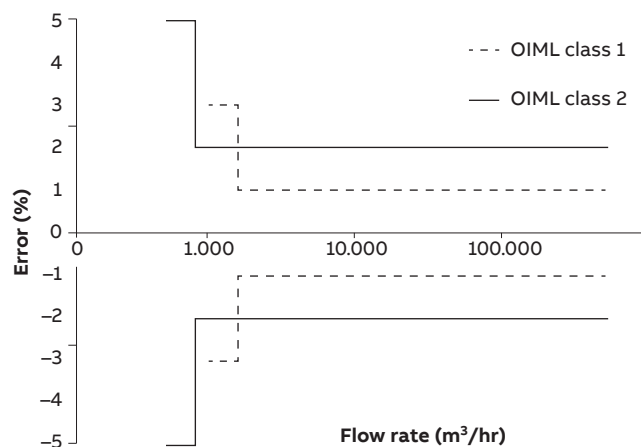
Measurement accuracy



DN	Mains powered		Battery/Renewable energy powered	
	Class 2 ±0.5 or ±0.4 %	Class 1 ±0.2 %	Class 2 ±0.5 or ±0.4 %	Class 1 ±0.2 %
40 to 600	±2 mm/s *	±1 mm/s *	±4 mm/s *	±2 mm/s *
700 to 2400	±4 mm/s *	±2 mm/s *	±6 mm/s *	±3 mm/s *

* whichever is the greater

Metrological performance to OIML R49:2013



DN	in	Q3 (m³/h)	Mains powered		Battery/Renewable energy powered	
			Class 2 (R = 500) Q1 (m³/h)	Class 1 (R = 250) Q1 (m³/h)	Class 2 (R = 250) Q1 (m³/h)	Class 1 (R = 125) Q1 (m³/h)
40	1½	40	0.08	0.16	0.16	0.32
50	2	63	0.13	0.25	0.25	0.50
65	2½	100	0.20	0.40	0.40	0.80
80	3	160	0.32	0.64	0.64	1.28
100	4	250	0.50	1	1	2
125	5	250	0.50	1	1	2
150	6	630	1.26	2.52	2.52	5.04
200	8	1000	2	4	4	8
250	10	1600	3.20	6.40	6.40	12.80
300	12	2500	5	10	10	20
350	14	4000	8	16	16	32
400	16	4000	8	16	16	32
450	18	6300	12.60	25.20	25.20	50.40
500	20	6300	12.60	25.20	25.20	50.40
600	24	10000	20	40	40	80

DN	in	Q3 (m³/h)	Mains powered		Battery/Renewable energy powered	
			Class 2 (R = 315) Q1 (m³/h)	Class 1 (R = 160) Q1 (m³/h)	Class 2 (R = 160) Q1 (m³/h)	Class 1 (R = 80) Q1 (m³/h)
700	28	16000	50.79	100	100	200
750	30	16000	50.79	100	100	200
800	32	16000	50.79	100	100	200
900	36	25000	79.37	156.20	156.25	312
1000	40	25000	79.37	156.20	156.25	312
1050	42	25000	79.37	156.20	156.25	312
1100	44	40000	126.98	250	250	500
1200	48	40000	126.98	250	250	500
1350	54	63000	200.00	393.7	393.75	787
1400	56	63000	200.00	393.70	393.75	787
1500	60	63000	200.00	393.70	393.75	787
1600	64	63000	200.00	393.70	393.75	787
1650	66	63000	200.00	393.7	393.7	787
1800	72	100000	317.46	625	625	1250
1950	78	100000	317.46	625	625	1250
2000	80	100000	317.46	625	625	1250
2100	84	100000	317.46	625	625	1250
2200	88	160000	507.94	1000	1000	2000
2400	96	160000	507.94	1000	1000	2000

$$Q2 = 1.6 * Q1$$

$$Q4 = 1.25 * Q3$$

$$Q3/Q1 = R$$

...Specification

...Full bore sensor

DN	in	Q3 (US gal/ min)	Mains powered		Battery/Renewable energy powered	
			Class 2 (R = 500)	Class 1 (R = 250)	Class 2 (R = 250)	Class 1 (R = 125)
			Q1 (US gal/ min)	Q1 (US gal/ min)	Q1 (US gal/ min)	Q1 (US gal/ min)
40	1½	176	0.35	0.70	0.7	1.41
50	2	277	0.55	1.11	1.11	2.22
65	2½	440	0.88	1.76	1.76	3.52
80	3	704	1.41	2.82	2.82	5.64
100	4	1101	2.20	4	4.40	8.81
125	5	1101	2.20	4	4.40	8.81
150	6	2774	5.55	11.10	11.10	22.2
200	8	4403	8.8	17.6	17.6	35.2
250	10	7045	14.09	28.2	28.2	56.4
300	12	11007	22	44	44	88
350	14	17611	35	70	70.4	141
400	16	17611	35	70	70.4	141
450	18	27738	55.48	111	111	222
500	20	27738	55.48	111	111	222
600	24	44029	88	176	176	352

$$Q2 = 1.6 * Q1$$

$$Q4 = 1.25 * Q3$$

$$Q3/Q1 = R$$

			Class 2 (R = 315)	Class 1 (R = 160)	Class 2 (R = 160)	Class 1 (R = 80)
700	28	70446	224	440	440	881
750	30	70446	224	440	440	881
800	32	70446	224	440	440	881
900	36	110072	349	688	688	1374
1000	40	110072	349	688	688	1374
1050	42	110072	349	688	688	1374
1100	44	176115	559	1101	1101	2201
1200	48	176115	559	1101	1101	2201
1350	54	277381	881	1733	1734	3465
1400	56	277381	881	1733	1734	3465
1500	60	277381	881	1733	1734	3465
1600	64	277381	881	1733	1734	3465
1650	66	277381	881	1733	1734	3465
1800	72	440287	1398	2752	2752	5504
1950	78	440287	1398	2752	2752	5504
2000	80	440287	1398	2752	2752	5504
2100	84	440287	1398	2752	2752	5504
2200	88	704459	2236	4403	4403	8806
2400	96	704459	2236	4403	4403	8806

$$Q2 = 1.6 * Q1$$

$$Q4 = 1.25 * Q3$$

$$Q3/Q1 = R$$

Bore sizes and flange types

Bore size range

DN40 to 2400

Flanges to standards

ASME

AWWA

ISO 7005 EN1092-1

DIN

AS4087

AS2129

JIS

Pressure limitations for flanges

As per flange rating

PN25 max. process temperature 50 °C (122 °F)

PN40 max. process temperature 40 °C (104 °F)

Pressure equipment directive 97/23/EC

This product is applicable in networks for the supply, distribution and discharge of water and associated equipment and is therefore exempt.

Bore and flange material

- DN40 to 200: SG iron
- DN250 to 2400: carbon steel
- Sizes DN40 to 200 coated with light gray 2-pack epoxy (RAL9002)
 - Primer: Interpon PZ660 zinc-based system, 70 microns thick
 - Top coat: Interpon 610 light gray polyester powder coating (RAL 9002), up to 150 microns thick, comparable to EN ISO 12944 grade C4
 - As a special requirements: 2-pack epoxy primer/ finish @ 300 µm DFT
- Sizes DN250 to 400: In-organic Zinc based system for the flanges and painted Cast aluminum housing (Paint coat ≥ 80 µm, RAL 9002)
- Sizes DN450 to 2400: Welded steel Design (Paint coat ≥ 80 µm, RAL 9002)

Terminal box for remote sensors

Polycarbonate

Environmental and process conditions

Ingress rating

- DN40 - 200 & DN450 - 2400 : IP68 (NEMA 6P) to 10 m (33 ft) for continuous submersion (Tested for 1500 hours according to IEC 60529)
- For buriable applications (DN40 to 200, virtual full bore, polypropylene liner and DN450 to 2400, full bore, rubber liner): $1\text{ m} < \text{sensor depth} \leq 5\text{ m}$
- DN250 - 400: IP68 (NEMA 6P) to 10 m (33 ft) for periodic submersion (Tested for 1500 hours according to IEC 60529)

Temperature ranges

Ambient: -25 to $70\text{ }^{\circ}\text{C}$ (-13 to $158\text{ }^{\circ}\text{F}$)

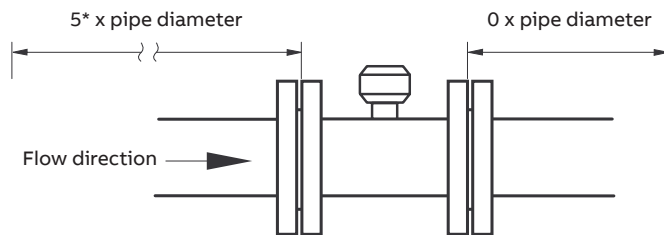
Ambient (OIML R49): -25 to $55\text{ }^{\circ}\text{C}$ (-13 to $131\text{ }^{\circ}\text{F}$)

Liner material	Bore size	Process temperature	
		Minimum	Maximum
Polypropylene	DN40 to 200	$-6\text{ }^{\circ}\text{C}$ ($21\text{ }^{\circ}\text{F}$)	$70\text{ }^{\circ}\text{C}$ ($158\text{ }^{\circ}\text{F}$)
Rubber	DN250 to 2400	$-10\text{ }^{\circ}\text{C}$ ($14\text{ }^{\circ}\text{F}$)	$80\text{ }^{\circ}\text{C}$ ($176\text{ }^{\circ}\text{F}$)

Conductivity

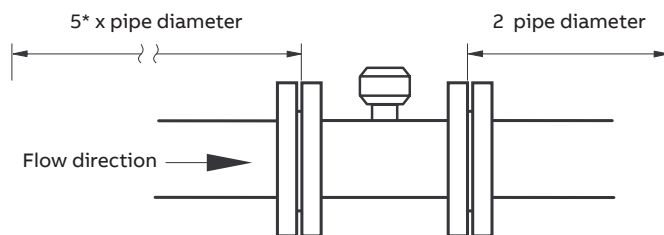
$>20\text{ }\mu\text{S/cm}$

Upstream and downstream pipe conditions (virtual full bore DN40 to 200)



* Upstream 0 X pipe diameter for OIML R49 Class 2 ($\pm 2\%$) accuracy only

Upstream and downstream pipe conditions (full bore DN250 to 2400)

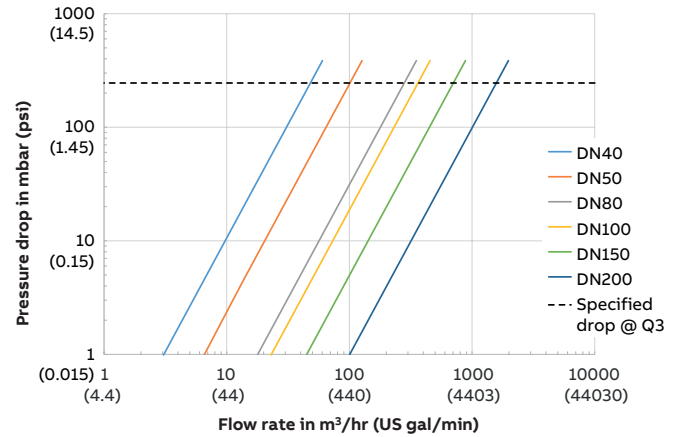


* Upstream 3 X pipe diameter for OIML R49 Class 2 ($\pm 2\%$) accuracy only

Pressure loss

Flow rate	Pressure loss in bar (psi)
Q_3	$<0.1\text{ bar}$ (1.5 psi) for DN40 and DN50 $<0.16\text{ bar}$ (2.4 psi) for DN65 to DN250
Q_3	$<0.1\text{ bar}$ (1.5 psi) for sizes DN250 and larger

Virtual full bore sensor pressure drop (typical)



Potable water approvals

WRAS*

ACS#

NSF – 61#

AZ/NZ 4020*

Approvals, certification and safety NSF

Certified to NSF/ANSI/CAN 61-G



* Material approval

#Meter Approval

...Specification

...Full bore sensor

Metrological certifications

- OIML R49:2013 for accuracy class 1 and 2 and water temperature class T50 0.1 to 50 °C (32.18 to 122 °F)
- Environmental class: O, M1 ,E1** and E2*
- MID MI-001
- NMI 10 for Australia
- PAC for China

DN	in	Q3 (m ³ /h)	Mains powered			Battery/Renewable energy powered		
			Class 2.5 (R = 315)	Class 2 (R = 500)	Class 1 (R = 250)	Class 2.5 (R = 160)	Class 2 (R = 250)	Class 1 (R = 125)
			Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)
40	1½	40	0.127	0.08	0.08 ⁽¹⁾	0.25	0.16	0.32
50	2	63	0.2	0.126	0.126 ⁽¹⁾	0.394	0.25	0.504
65	2½	100	0.32	0.20	0.20 ⁽¹⁾	0.625	0.40	0.4 ⁽²⁾
80	3	160	0.508	0.32	0.32 ⁽¹⁾	1	0.64	0.64 ⁽²⁾
100	4	250	0.79	0.50	0.5 ⁽¹⁾	1.56	1	1 ⁽²⁾
125	5	250	0.79	0.50	0.5 ⁽¹⁾	1.56	1	1 ⁽²⁾
150	6	630	2	1.26	2.52	3.94	2.52	5.04
200	8	1000	3.17	2	4	6.25	4	8
250	10	1600	5.08	3.20	6.40	10	6.40	12.80
300	12	2500	7.94	5	10	15.625	10	20
350	14	4000	63.5 ⁽⁸⁾	40 ⁽³⁾	40 ⁽³⁾	25.0	16	16 ⁽²⁾
400	16	4000	63.5 ⁽⁸⁾	40 ⁽³⁾	40 ⁽³⁾	25.0	16	16 ⁽²⁾
450	18	6300	100 ⁽⁸⁾	63 ⁽³⁾	63 ⁽³⁾	39.375	25.20	25.2 ⁽²⁾
500	20	6300	100 ⁽⁸⁾	63 ⁽³⁾	63 ⁽³⁾	39.375	25.20	25.2 ⁽²⁾
600	24	6300	100 ⁽⁸⁾	63 ⁽³⁾	63 ⁽³⁾	63 ⁽³⁾	39.37 ⁽⁴⁾	78.75 ⁽⁵⁾
700	28	10000	80 ⁽⁷⁾	50 ⁽⁶⁾	100 ⁽³⁾	158.7 ⁽⁸⁾	100 ⁽³⁾	200 ⁽⁹⁾
750	30	10000	80 ⁽⁷⁾	50 ⁽⁶⁾	100 ⁽³⁾	158.7 ⁽⁸⁾	100 ⁽³⁾	200 ⁽⁹⁾
800	32	10000	80 ⁽⁷⁾	50 ⁽⁶⁾	100 ⁽³⁾	158.7 ⁽⁸⁾	100 ⁽³⁾	200 ⁽⁹⁾
900	36	10000	125 ⁽⁵⁾	80 ⁽⁷⁾	158.7 ⁽⁸⁾	250 ⁽¹⁰⁾	158.7 ⁽⁸⁾	-
1000	40	16000	128 ⁽⁷⁾	80 ⁽⁶⁾	160 ⁽³⁾	254 ⁽⁸⁾	160 ⁽³⁾	-
1050	42	16000	128 ⁽⁷⁾	80 ⁽⁶⁾	160 ⁽³⁾	254 ⁽⁸⁾	160 ⁽³⁾	-
1100	44	16000	200 ⁽⁵⁾	128 ⁽⁷⁾	253.9 ⁽⁸⁾	400 ⁽¹⁰⁾	254 ⁽⁸⁾	-
1200	48	16000	200 ⁽⁵⁾	128 ⁽⁷⁾	253.9 ⁽⁸⁾	400 ⁽¹⁰⁾	254 ⁽⁸⁾	-
1350	54	16000	254 ⁽⁸⁾	200 ⁽⁵⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	-
1400	56	16000	254 ⁽⁸⁾	200 ⁽⁵⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	-
1500	60	16000	254 ⁽⁸⁾	200 ⁽⁵⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	-
1600	64	16000	400 ⁽¹⁰⁾	200 ⁽⁵⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	-
1650	66	16000	400 ⁽¹⁰⁾	200 ⁽⁵⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	-
1800	72	16000	400 ⁽¹⁰⁾	317.5 ⁽⁹⁾	-	-	-	-

(1) R = 500, (2) R = 250, (3) R = 100, (4) R = 160, (5) R = 80, (6) R = 200,
(7) R = 125, (8) R = 63, (9) R = 50, (10) R = 40

Q2 = 1.6 * Q1

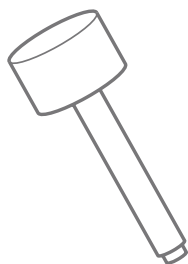
Q4 = 1.25 * Q3

Q3/Q1 = R

* Applicable only for internal antenna devices of FEX45X & all options of FEX43X

** Applicable for external antenna devices of FEX45X

Insertion flowmeter



Mounting

Integral transmitter

On probe sensor

Remote transmitter

Off probe sensor

Insertion details

Size range

300 to 1000 mm (12 to 40 in)

Pipe sizes

200 to 8000 mm (8 to 320 in) nominal bore

Pressure limitations

20 bar (295 psi) absolute

Pressure equipment directive 97/23/EC

This product is applicable in networks for the supply, distribution and discharge of water and associated equipment and is therefore exempt.

Sensor body material

316L stainless steel

Sensor tip material

PEEK

Terminal box material for remote sensors

Polycarbonate

Threaded connection

1 in BSP

1 in NPT

1½ in BSP

Pressure tapping provision

½ in BSP

Note: Insertion flow meters are recommended to be used with Metallic pipes only.

Environmental and process conditions

Ingress rating

IP68 (NEMA 6P) to 10 m (33 ft)

Temperature ranges

Ambient: -20 to 60 °C (-4 to 140 °F)

Process: 0 to 60 °C (32 to 140 °F)

Conductivity

>50 µS/cm

Metrological performance and certifications

Velocity accuracy

±2 % of rate or ±2 mm/s (±0.08 in/s)

whichever is the greater

Volume accuracy

Refer to ISO 7145-1982 (BS 1042 section 2.2) for details

Flow condition

Fully developed profile in accordance with ISO 7145-1982 (BS1042 section 2.2.)

Maximum flow

The maximum velocity depends upon the actual insertion length. Typical insertion lengths are 0.125 and 0.5 x pipe diameter. Figure 2 is a guide* to the maximum allowable velocity for different insertion lengths.

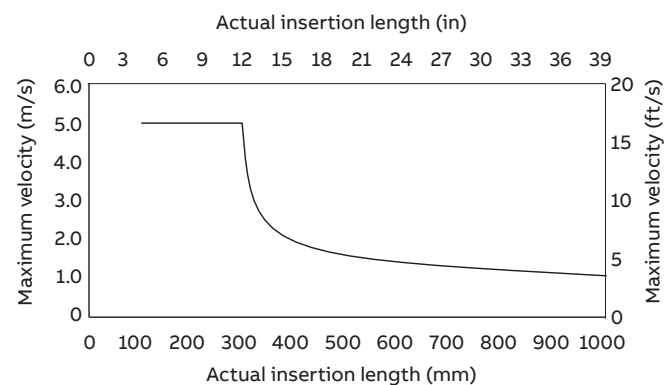


Figure 2 Maximum allowable velocity for different insertion lengths

Potable water approvals for wetted parts

WRAS

ACS

NSF-61

* Figure 2 is intended as a guide only. Factors that influence the maximum insertion length into the pipe include: flow sensor mounting components (for example, standoffs, bushes and valves) pipeline vibration, fluid vibration and pump noise.

...Specification

...Insertion flowmeter

Pressure transducer (option)

Ingress protection

IP68 to 10 m (33 ft)

Wetted parts

303L stainless steel, Viton® and 96 % alumina

Process temperature range

-10 to 50 °C (14 to 122 °F) (protect transducer from frost)

Ambient temperature range

-20 to 70 °C (-4 to 158 °F)

Pressure range (specify when ordering)

20 and 40 bar absolute

Accuracy (typical)

- $< \pm 0.1\%$ of span + thermal errors
- Thermal zero shift $< 0.01\%$ span/°C
- Thermal span shift $< \pm 0.015\%$ /°C

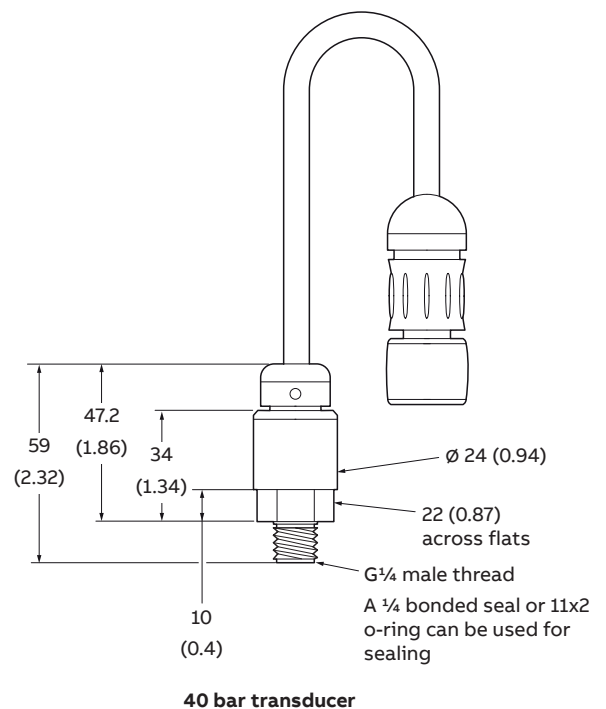
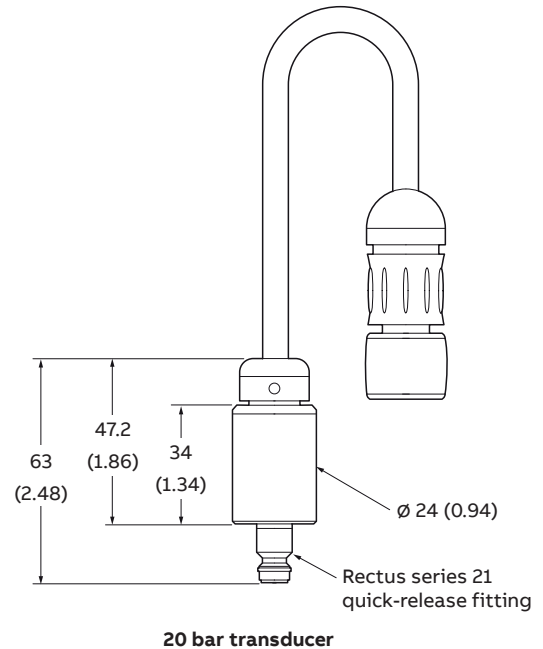
Potable water approvals for wetted parts

WRAS

Dimensions

Dimensions in mm (in)

All dimensions nominal



Dimensions – sensors

R-style sensor – DN 40 to DN 300 (1½ to 12 in)

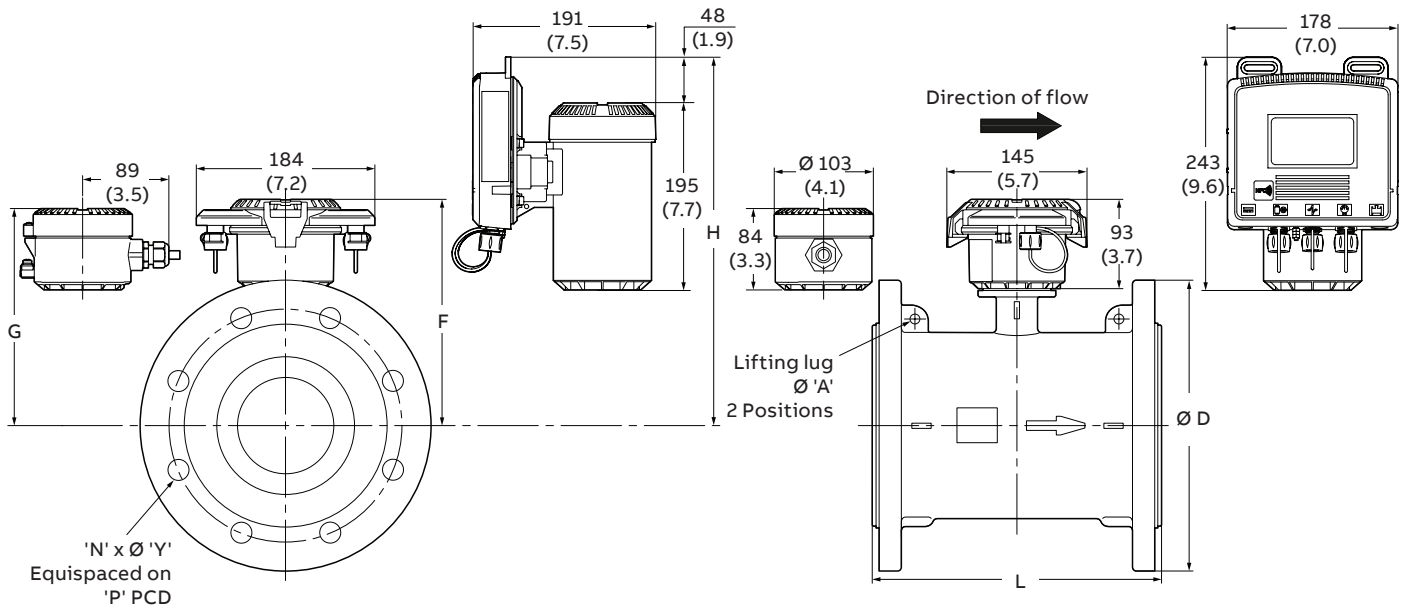


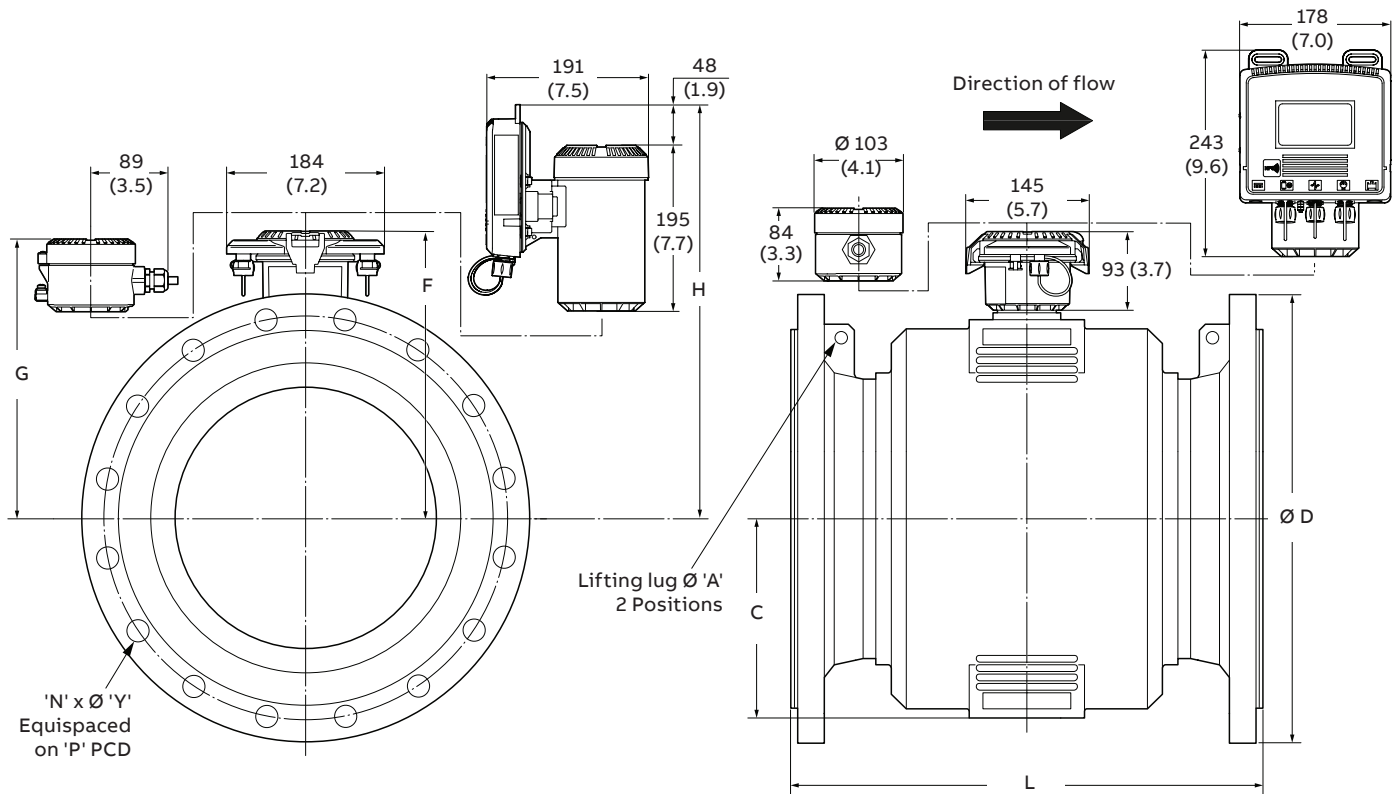
Figure 3 R-style sensor – DN 40 to DN 300 (1½ to 12 in)

Table 1 R-style sensor – DN 40 to DN 80 (1½ to 3 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug	Integral FEW411/FEW431	Remote	Integral FEW451
			D	N	Y	P	L	F	G	H	A			
DN 40 (1½ in)	EN 1092	PN 10, 16, 25	150 (5.9)		19 (0.75)	110 (4.3)						13 (29)	12 (27)	15 (34)
	ASME B16.5	CL150			15.7 (0.62)	98 (3.9)								
	AS 2129	Table E	135 (5.3)	4	14 (0.55)	98 (3.9)	200 (7.9)	158 (6.2)	149 (5.9)	308 (12.1)	N/A	11 (24)	8 (18)	13 (29)
	JIS B2220	5K	120 (4.7)		15 (0.59)	95 (3.7)		154 (6.1)	144 (5.7)	304 (12.0)				
		10K	140 (5.5)		19 (0.75)	105 (4.2)								
DN 50 (2 in)	EN 1092	PN 10, 16, 25	165 (6.5)		19 (0.75)	125 (4.9)			153 (6.0)			15 (32)	14 (30)	17 (38)
	ASME B16.5	CL150			19 (0.75)	121 (4.8)								
	AS 2129	Table E	150 (5.9)	4	18 (0.71)	114 (4.5)	200 (7.9)	162 (6.4)		312 (12.3)	N/A	12 (26)	9 (20)	14 (31)
	AS 4087	PN 16	130 (5.1)		15 (0.59)	105 (4.1)			152 (6.0)					
	JIS B2220	5K	130 (5.1)		15 (0.59)	105 (4.1)								
		10K	155 (6.1)		19 (0.75)	120 (4.7)								
DN 65 (2½ in)	EN 1092	PN 10, 16	185 (7.3)	4	19 (0.75)	145 (5.7)						19 (42)	18 (40)	21 (47)
	ASME B16.5	CL150		8	20 (0.79)	140 (5.5)								
	AS 2129	Table E	165 (6.5)	4	18 (0.71)	127 (5.0)	200 (7.9)	176 (6.9)	167 (6.6)	326 (12.8)	N/A	14 (31)	11 (24)	16 (36)
	AS 4087	PN 16	155 (6.1)		15 (0.59)	130 (5.1)		168 (6.6)	158 (6.2)	318 (12.5)				
	JIS B2220	5K	155 (6.1)		15 (0.59)	130 (5.1)								
		10K	175 (6.9)		19 (0.75)	140 (5.5)								
DN 80 (3 in)	EN 1092	PN 10, 16, 25	200 (7.9)	8	19 (0.75)	160 (6.3)						21 (47)	20 (44)	23 (51)
	ASME B16.5	CL150			20 (0.79)	152 (6.0)								
	AS 2129	Table E	185 (7.3)	4	18 (0.71)	146 (5.8)	200 (7.9)	181 (7.1)	172 (6.8)	331 (13.0)	N/A	17 (37)	14 (31)	19 (42)
	AS 4087	PN 16	180 (7.1)		15 (0.59)	145 (5.7)		174 (6.9)	165 (6.5)	324 (12.8)				
	JIS B2220	5K	180 (7.1)		15 (0.59)	145 (5.7)								
		10K	185 (7.3)	8	19 (0.75)	150 (5.9)								

...R-style sensor – DN 40 to DN 300 (1½ to 12 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug			
			D	N	Y	P	L	F	G	H	A	Integral FEW411/FEW431	Remote	Integral FEW451
DN 100 (4 in)	EN 1092	PN 10, 16	235 (9.3)	8	19 (0.75)	180 (7.1)	250 (9.9)	202 (8.0)	193 (7.6)	352 (13.9)	N/A	27 (60)	26 (58)	29 (64)
		PN 25			23 (0.91)	190 (7.5)								
	ASME B16.5	CL150	215 (8.5)	4	19 (0.75)	191 (7.5)	212 (8.3)	203 (8.0)	362 (14.3)	23 (51)	20 (44)	25 (56)		
	AS 2129	Table E			18 (0.71)	178 (7.0)								
	AS 4087	PN 16	19 (0.75)	165 (6.5)	212 (8.3)	203 (8.0)	362 (14.3)	23 (51)	20 (44)	25 (56)				
	JIS B2220	5K	200 (7.9)	8							19 (0.75)	195 (7.7)		
		7.5K	238 (9.4)	4	19 (0.75)	175 (6.9)								
		10K	210 (8.3)	8										
DN 125 (5 in)	EN 1092	PN 10, 16	270 (10.6)	8	18 (0.71)	210 (8.3)	250 (9.9)	221 (8.7)	212 (8.3)	371 (14.6)	N/A	30 (66)	29 (64)	32 (71)
		PN 25			28 (1.10)	220 (8.7)								
	ASME B16.5	CL150	255 (10.0)	8	22 (0.87)	216 (8.5)	212 (8.3)	203 (8.0)	362 (14.3)	26 (57)	23 (51)	28 (62)		
	AS 2129	Table E			18 (0.71)	210 (8.3)								
	AS 4087	PN 16	19 (0.75)	200 (7.9)	212 (8.3)	203 (8.0)	362 (14.3)	26 (57)	23 (51)	28 (62)				
	JIS B2220	5K	235 (9.3)	23 (0.91)							210 (8.3)			
		10K	250 (9.8)											
DN 150 (6 in)	EN 1092	PN 10, 16	300 (11.8)	8	23 (0.91)	240 (9.5)	300 (11.8)	233 (9.2)	224 (8.8)	383 (15.1)	10.2 (0.40)	35 (77)	34 (75)	37 (82)
		PN 25			22 (0.87)	242 (9.5)								
	ASME B16.5	CL150	280 (11.0)	8	26 (1.02)	250 (9.8)	223 (8.8)	383 (15.1)	10.2 (0.40)	33 (73)	31 (68)	35 (78)		
	AS 2129	Table E			22 (0.87)	235 (9.3)								
	AS 4087	PN 16	18 (0.71)	235 (9.3)	223 (8.8)	383 (15.1)	10.2 (0.40)	33 (73)	31 (68)	35 (78)				
	JIS B2220	5K	265 (10.4)	19 (0.75)							230 (9.1)			
		7.5K	290 (11.4)	6	19 (0.75)	247 (9.7)								
		10K	280 (11.0)	8	23 (0.91)	240 (9.5)								
DN 200 (8 in)	EN 1092	PN 10	370 (14.6)	8	23 (0.91)	295 (11.6)	350 (13.8)	259 (10.2)	249 (9.8)	409 (16.1)	10.2 (0.40)	68 (150)	67 (147)	70 (155)
		PN 16												
	ASME B16.5	CL150	335 (13.2)	8	22 (0.87)	298 (11.7)	258 (10.2)	408 (16.1)	51 (112)	48 (106)	53 (117)			
	AS 2129	Table E			18 (0.71)	292 (11.5)								
	AS 4087	PN 16	23 (0.91)	280 (11.0)	258 (10.2)	408 (16.1)	51 (112)	48 (106)	53 (117)					
	JIS B2220	5K	320 (12.6)	19 (0.75)						299 (11.8)				
		7.5K	342 (8.7)	12	23 (0.91)	290 (11.4)								
		10K	330 (13.0)	12										
DN 250 (10 in)	EN 1092	PN10	395 (15.6)	12	22 (0.87)	350 (0.87)	450 (17.7)	285 (11.2)	276 (10.9)	435 (17.1)	10.2 (0.40)	78 (172)	75 (165)	80 (177)
		PN16			26 (1.02)	355 (14.0)								
	ASME B16.5	CL150	405 (15.9)	8	30 (1.18)	370 (14.6)	310 (12.2)	301 (11.9)	460 (18.1)	10.2 (0.40)	115 (253)	112 (247)	117 (258)	
	AS 2129	Table E			22 (0.87)	356 (14.0)								
	AS 4087	PN 16	23 (0.91)	345 (13.6)	310 (12.2)	301 (11.9)	460 (18.1)	10.2 (0.40)	115 (253)	112 (247)	117 (258)			
	JIS B2220	5K												

R-style sensor – DN 350 to DN 600 (14 to 24 in)**Figure 4 R-style sensor – DN 350 to DN 600 (14 to 24 in)**

...R-style sensor – DN 350 to DN 600 (14 to 24 in)

Sensor size	Flange		Dimensions in mm (in)										Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. Holes	Bolt hole dia	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug	Cover flat			
			D	N	Y	P	L	F	G	H	A	C	Integral FEW411/FEW431	Remote	Integral FEW451
DN 350 (14 in)	EN 1092	PN 10	505 (19.9)	16	22 (0.87)	460 (18.1)	550 (21.7)	334 (13.2)	324 (12.8)	484 (19.1)	14.5 (0.57)	231 (9.1)	102 (225)	100 (220)	104 (230)
		PN 16	520 (20.5)		26 (1.02)	470 (18.5)									
		PN 25	555 (21.9)		33 (1.30)	490 (19.3)									
	ASME B16.5	CL150	535 (21.1)	12	29.5 (1.16)	476 (18.8)									
	AS 2129	Table E	525 (20.7)		26 (1.02)	470 (18.5)									
	AS 4087	PN 16													
	JIS B2220	5K	480 (18.9)	10	25 (0.98)	472 (18.6)									
		7.5K	530 (20.7)		472 (18.6)										
10K		490 (19.3)	16		445 (17.5)										
DN 400 (16 in)	EN 1092	PN 10	565 (22.3)	16	26 (1.02)	515 (20.3)	600 (23.6)	360 (14.2)	354 (13.9)	510 (20.1)	14.5 (0.57)	257 (10.1)	117 (258)	115 (254)	119 (263)
		PN 16	580 (22.8)		30 (1.18)	525 (20.7)									
		PN 25	620 (24.4)		36 (1.42)	550 (21.7)									
	ASME B16.5	CL150	600 (23.6)	12	29.5 (1.16)	540 (21.3)									
	AS 2129	Table E	580 (22.8)		26 (1.02)	521 (20.5)									
	AS 4087	PN 16													
	JIS B2220	5K	540 (21.3)	16	25 (0.98)	495 (19.5)									
		7.5K	582 (22.9)		12	524 (20.6)									
10K		560 (22.1)	16		27 (1.06)	510 (20.1)									
DN 450 (18 in)	EN 1092	PN 10	615 (24.2)	20	26 (1.02)	565 (22.3)	700 (27.6)	388 (15.3)	379 (14.9)	538 (21.2)	14.5 (0.57)	285 (11.2)	162 (357)	160 (353)	164 (362)
		PN 16	640 (25.2)		30 (1.18)	585 (23.0)									
		PN 25	670 (26.4)		36 (1.42)	600 (23.6)									
	ASME B16.5	CL150	635 (25.0)	16	32.5 (1.28)	578 (22.8)									
	AS 2129	Table E	640 (25.2)		26 (1.02)	584 (23.0)									
	AS 4087	PN 16													
	JIS B2220	5K	605 (23.8)	16	25 (0.98)	555 (21.9)									
		7.5K	652 (25.7)		12	585 (23.0)									
10K		620 (24.4)	20		565 (22.3)										
DN 500 (20 in)	EN 1092	PN 10	670 (26.4)	20	26 (1.02)	620 (24.4)	770 (30.3)	419 (16.5)	410 (16.2)	569 (22.4)	14.5 (0.57)	316 (12.5)	219 (483)	217 (477)	221 (488)
		PN 16	715 (28.2)		33 (1.30)	650 (25.6)									
		PN 25	730 (28.7)		36 (1.42)	660 (26.0)									
	ASME B16.5	CL150	700 (27.6)	16	32.5 (1.28)	635 (25.0)									
	AS 2129	Table E	705 (27.8)		26 (1.02)	641 (25.2)									
	AS 4087	PN 16													
	JIS B2220	5K	655 (25.8)	20	25 (0.98)	605 (23.8)									
		7.5K	706 (27.8)		12	639 (25.2)									
10K		675 (26.6)	20		27 (1.06)	620 (24.4)									
DN 600 (24 in)	EN 1092	PN 10	780 (30.7)	20	30 (1.18)	725 (28.6)	920 (36.2)	446 (17.6)	437 (17.2)	596 (23.5)	14.5 (0.57)	343 (13.5)	317 (699)	315 (695)	319 (704)
		PN 16	840 (33.1)		36 (1.42)	770 (30.3)									
		PN 25	845 (33.3)		39 (1.54)										
	ASME B16.5	CL150	815 (32.1)	16	35.5 (1.40)	749.5 (29.5)									
	AS 2129	Table E	825 (32.5)		33 (1.30)	756 (29.7)									
	AS 4087	PN 16													
	JIS B2220	5K	770 (30.3)	20	27 (1.06)	715 (28.2)									
		7.5K	810 (31.9)		16	743 (29.3)									
10K		795 (31.3)	24		33 (1.30)	730 (28.7)									

V-style sensor – DN 40 to DN 200 (1½ to 8 in)

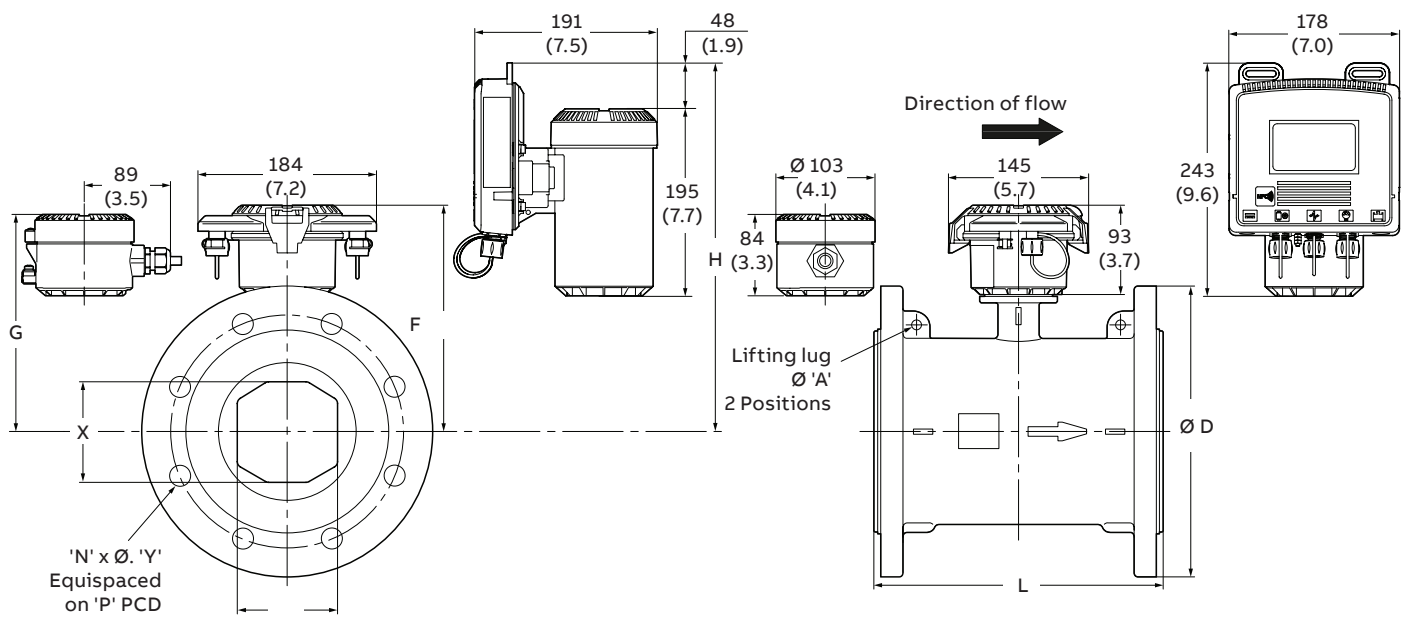


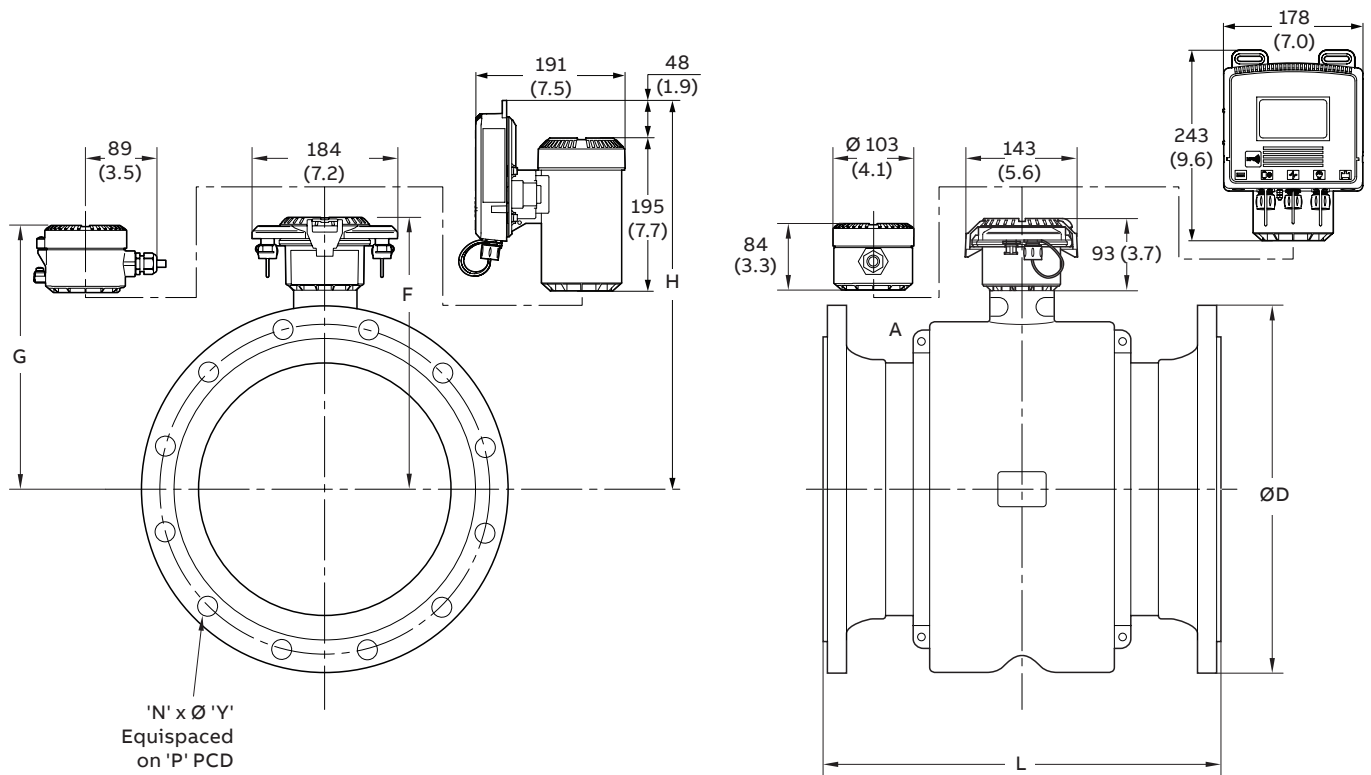
Figure 5 V-style sensor – DN 40 to DN 200 (1½ to 8 in)

...Dimensions – sensors

...V-style sensor – DN 40 to DN 200 (1½ to 8 in)

Table 4 V-style sensor – DN 40 to DN 200 (1½ to 8 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)			
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug				
			D	N	Y	P	L	F	G	H	A	Integral FEW411	Remote FEW431	Integral FEW451	
DN 40 (1½ in)	EN 1092	PN 10, 16, 25	150 (5.9)	4	19 (0.75)	110 (4.3)	200 (7.9)	158 (6.2)	149 (5.9)	308 (12.1)	N/A	13 (29)	12 (27)	15 (33)	
	ASME B16.5	CL150			15.7 (0.62)	98 (3.9)									
	AS 2129	Table E	135 (5.3)		14 (0.55)			154 (6.1)	144 (5.7)	304 (12)		10 (22)	7 (15)	12 (27)	
	JIS B2220	10K	140 (5.5)		19 (0.75)	105 (4.2)									
DN 50 (2 in)	EN 1092	PN 10, 16, 25	165 (6.5)	4	19 (0.75)	125 (4.9)	200 (7.9)	162 (6.4)	153 (6.0)	312 (12.3)	N/A	14 (31)	13 (29)	16 (36)	
	ASME B16.5	CL150				121 (4.8)									
	AS 2129	Table E	150 (5.9)		18 (0.71)	114 (4.5)						11 (24)	8 (18)	13 (29)	
	AS 4087	PN 16													
DN 65 (2½ in)	EN 1092	PN 10, 16	185 (7.3)	4	19 (0.75)	145 (5.7)	200 (7.9)	176 (6.9)	167 (6.6)	326 (12.9)	N/A	16 (35)	15 (33)	18 (40)	
	ASME B16.5	CL150		8	20 (0.79)	140 (5.5)									
	AS 2129	Table E	165 (6.5)	4	18 (0.71)	127 (5.0)						13 (29)	10 (22)	15 (33)	
	AS 4087	PN 16													
DN 80 (3 in)	EN 1092	PN 10, 16, 25	200 (7.9)	8	19 (0.75)	160 (6.3)	200 (7.9)	181 (7.1)	172 (6.8)	331 (13.1)	N/A	17 (38)	16 (36)	19 (42)	
	ASME B16.5	CL150			20 (0.79)	152 (6.0)									
	AS 2129	Table E		4	18 (0.71)	146 (5.8)						16 (36)	13 (28)	18 (40)	
	AS 4087	PN 16	185 (7.3)												
DN 100 (4 in)	EN 1092	PN 10, 16	235 (9.3)	8	19 (0.75)	180 (0.71)	250 (9.9)	202 (8.0)	193 (7.6)	352 (13.9)	N/A	19 (42)	18 (40)	21 (47)	
	ASME B16.5	CL150			23 (0.91)	190 (7.5)									
	AS 2129	Table E	215 (8.5)		19 (0.75)	191 (7.5)									
	AS 4087	PN 16			18 (0.71)	178 (7.0)									
DN 125 (5 in)	EN 1092	PN 10, 16	270 (10.6)	8	19 (0.75)	195 (7.7)	250 (9.9)	212 (8.3)	203 (8.0)	362 (14.2)	N/A	24 (53)	21 (46)	26 (58)	
	ASME B16.5	CL150													
	AS 2129	Table E	255 (10.0)		19 (0.75)	175 (6.9)									
	AS 4087	PN 16			18 (0.71)	178 (7.0)									
DN 150 (6 in)	EN 1092	PN10, 16	300 (11.8)	8	23 (0.91)	240 (9.5)	300 (11.8)	233 (9.2)	224 (8.8)	383 (15.1)	10.2 (0.40)	35 (77)	34 (75)	37 (82)	
	ASME B16.5	CL150			22 (0.87)	242 (9.5)									
	EN 1092	PN 25			26 (1.02)	250 (9.8)									
	AS 2129	Table E	280 (11.0)		22 (0.87)	235 (9.3)						34 (75)	31 (68)	36 (80)	
DN 200 (8 in)	EN 1092	PN 16	370 (14.6)	6	19 (0.75)	247 (9.7)	350 (13.8)	258 (10.2)	249 (9.8)	408 (16.1)	10.2 (0.40)	53 (116)	50 (110)	55 (122)	
	ASME B16.5	CL150		8	23 (0.91)	240 (9.5)									
	AS 2129	Table E	335 (13.2)	12	28 (1.10)	310 (12.2)									
	AS 4087	PN 16			22 (0.87)	298 (11.7)									
DN 200 (8 in)	EN 1092	PN10	370 (14.6)	8	23 (0.91)	295 (11.6)	350 (13.8)	259 (10.2)	249 (9.8)	409 (16.1)	10.2 (0.40)	67 (147)	66 (145)	69 (153)	
	ASME B16.5	CL150		12	28 (1.10)	310 (12.2)									
	AS 2129	Table E	335 (13.2)	8	22 (0.87)	292 (11.5)									
	AS 4087	PN 16			18 (0.71)	299 (11.8)									
DN 200 (8 in)	EN 1092	PN10	370 (14.6)	8	23 (0.91)	295 (11.6)	350 (13.8)	259 (10.2)	249 (9.8)	409 (16.1)	10.2 (0.40)	67 (147)	66 (145)	69 (153)	
	ASME B16.5	CL150		12	28 (1.10)	310 (12.2)									
	AS 2129	Table E	335 (13.2)	8	22 (0.87)	292 (11.5)									
	AS 4087	PN 16			18 (0.71)	299 (11.8)									

F-style sensor – DN 250 to DN 400 (10 to 16 in)**Figure 6 F-style sensor – DN 250 to DN 400 (10 to 16 in)**

...Dimensions – sensors

...F-style sensor – DN 250 to DN 400 (10 to 16 in)

Table 5 F-style sensor – DN 250 to DN 400 (10 to 16 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug	Integral FEW411/FEW431	Remote	Integral FEW451
			D	N	Y	P	L	F	G	H	A			
DN250 (10 in)	EN 1092 or DIN	PN10	395 (15.55)	12	22 (0.87)	350 (13.78)	450 (17.72)	319 (12.56)	310 (12.20)	469 (18.46)	N/A	61 (134)	59 (130)	63 (139)
		PN16	405 (15.94)		26 (1.02)	355 (13.98)						65 (143)	63 (139)	67 (148)
		PN25	425 (16.73)		30 (1.18)	370 (14.57)						84 (185)	82 (181)	86 (190)
		PN40	450 (17.72)		33 (1.30)	385 (15.16)						95 (209)	93 (205)	97 (214)
	AS4087	PN16	405 (15.94)	8	22 (0.87)	356 (14.02)						65 (143)	63 (139)	67 (148)
		PN35	430 (16.93)		26 (1.02)	381 (15.00)						95 (209)	93 (205)	97 (214)
	JIS B2220	5K	385 (15.16)	12	23 (0.91)	345 (13.58)						65 (143)	63 (139)	67 (148)
		10K	400 (15.75)		25 (0.98)	355 (13.98)								
	ASME B16.5	CL300	445 (17.52)	16	29 (1.13)	387 (15.25)						105 (231)	103 (227)	107 (236)
		CL150	405 (15.94)	12	26 (1.02)	362 (14.25)						70 (154)	68 (150)	72 (159)
DN300 (12 in)	EN 1092 or DIN	PN10	445 (17.52)	12	22 (0.87)	400 (15.75)	500 (19.69)	342 (13.46)	333 (13.11)	492 (19.37)	N/A	74 (163)	72 (159)	76 (168)
		PN16	460 (18.11)		26 (1.02)	410 (16.14)						80 (176)	78 (172)	82 (181)
		PN25	485 (19.09)		30 (1.18)	430 (16.93)						100 (220)	98 (216)	102 (225)
		PN40	515 (20.28)		33 (1.30)	450 (17.72)						130 (287)	128 (282)	132 (291)
	JIS B2220	5K	430 (16.93)	12	23 (0.91)	390 (15.35)	80 (176)					78 (172)	82 (181)	
		10K	445 (17.52)		16	25 (0.98)	400 (15.75)							
	AS4087	PN16	455 (17.91)	12	22 (0.87)	406 (15.98)	500 (19.69)					130 (287)	128 (282)	132 (291)
		PN35	490 (19.29)	26	26 (1.02)	438 (17.24)						150 (331)	148 (326)	152 (336)
	ASME B16.5	CL300	520 (20.47)	16	32 (1.25)	451 (17.75)						105 (231)	103 (227)	107 (236)
		CL150	485 (19.09)	12	26 (1.02)	432 (17.00)								
DN350 (14 in)	EN 1092 or DIN	PN10	505 (19.88)	16	22 (0.87)	460 (18.11)	550 (21.65)	357 (14.06)	348 (13.70)	507 (19.96)	N/A	95 (209)	93 (205)	97 (214)
		PN16	520 (20.47)		26 (1.02)	470 (18.50)						110 (243)	108 (238)	112 (247)
		PN25	555 (21.85)		33 (1.30)	490 (19.29)						145 (320)	143 (315)	147 (324)
		PN40	580 (22.83)		36 (1.42)	510 (20.08)						195 (430)	193 (425)	197 (435)
	JIS B2220	5K	480 (18.90)	12	22 (0.87)	435 (17.13)	95 (209)					93 (205)	97 (214)	
		10K	490 (19.29)	16	25 (0.98)	445 (17.52)								
	AS4087	PN16	525 (20.67)	12	26 (1.02)	470 (18.50)	550 (21.65)					130 (287)	128 (282)	132 (291)
		PN35	550 (21.65)	16	30 (1.18)	495 (19.49)						185 (408)	183 (403)	187 (412)
	ASME B16.5	CL300	585 (23.03)	20	32 (1.25)	514(20.25)						140 (309)	138 (304)	142 (314)
		CL150	535 (21.06)	12	29 (1.14)	476 (18.75)						105 (231)	103 (227)	107 (236)
DN400 (16 in)	EN 1092 or DIN	PN10	565 (22.24)	16	26 (1.02)	515 (20.28)	600 (23.62)	399 (15.71)	390 (15.35)	549 (21.61)	N/A	103 (227)	101 (223)	105 (232)
		PN16	580 (22.83)		30 (1.18)	525 (20.67)						126 (278)	124 (273)	128 (283)
		PN25	620 (24.41)		36 (1.42)	550 (21.65)						170 (375)	168 (370)	172 (380)
		PN40	660 (25.98)		39 (1.54)	585 (23.03)						258 (569)	256 (564)	260 (574)
	JIS B2220	5K	540 (21.26)	12	25 (0.98)	495 (19.49)	103 (227)					101 (223)	105 (232)	
		10K	560 (22.05)	16	27 (1.06)	510 (20.08)	116 (256)					114 (251)	118 (261)	
	AS4087	PN16	580 (22.83)	12	26 (1.02)	521 (20.51)	600 (23.62)					154 (340)	152 (335)	156 (344)
		PN35	610 (24.02)	20	30 (1.18)	552 (21.73)						302 (666)	300 (661)	304 (670)
	ASME B16.5	CL300	650 (25.59)	24	35 (1.38)	572 (22.50)						265 (584)	263 (580)	267 (589)
		CL150	600 (23.62)	12	29 (1.14)	540 (21.25)						175 (386)	173 (381)	177 (391)

F-style sensor – DN 450 to DN 600 (18 to 24 in)

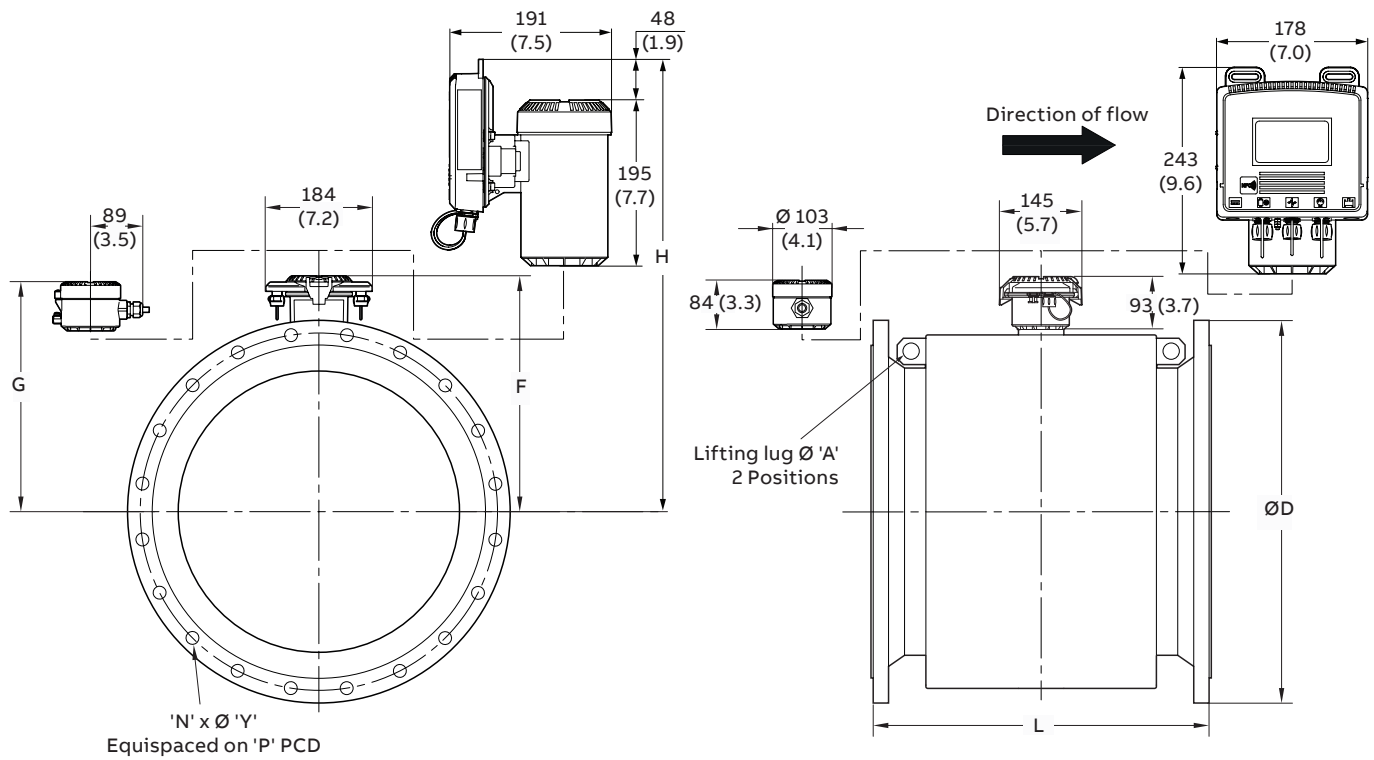


Figure 7 F-style sensor – DN 450 to DN 600 (18 to 24 in)

...Dimensions – sensors

...F-style sensor – DN 450 to DN 600 (18 to 24 in)

Table 6 F-style sensor – DN 450 to DN 600 (18 to 24 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug	Integral FEW411/FEW431	Remote	Integral FEW451
			D	N	Y	P	L	F	G	H	A			
DN450 (18 in)	EN 1092 or DIN	PN10	615 (24.21)	20	26 (1.02)	565 (22.24)	600	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	173 (381)	171 (377)	175 (386)
		PN16	640 (25.20)		30 (1.18)	585 (23.03)	(23.62)					188 (414)	186 (410)	190 (419)
		PN25	670 (26.38)		36 (1.42)	600 (23.62)	686					245 (540)	243 (536)	247 (545)
		PN40	685 (26.97)		39 (1.54)	610 (24.02)	(27.01)					315 (694)	313 (690)	317 (699)
	JIS B2220	5K	605 (23.82)	16	25 (0.98)	555 (21.85)	600 (23.62)	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	165 (364)	163 (359)	167 (369)
		10K	620 (24.41)	20	27 (1.06)	565 (22.24)						177 (390)	175 (386)	179 (395)
	AS4087	PN16	640 (25.20)	12	26 (1.02)	584 (22.99)	600 (23.62)	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	232 (511)	230 (507)	234 (516)
		PN35	675 (26.57)	20	33 (1.30)	610 (24.02)						328 (723)	326 (719)	330 (728)
	ASME B16.5	CL300	710 (27.95)	24	35 (1.38)	629 (24.75)	762 (30.00)	458 (18.03)	449 (17.68)	608 (23.94)	30 (1.18)	368 (811)	366 (807)	370 (816)
		CL150	635 (25.00)	16	32 (1.26)	578 (22.75)						250 (551)	248 (547)	252 (556)
DN500 (20 in)	EN 1092 or DIN	PN10	670 (26.38)	20	26 (1.02)	620 (24.41)	600	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	190 (419)	188 (414)	192 (424)
		PN16	715 (28.15)		33 (1.30)	650 (25.59)	(23.62)					240 (529)	238 (525)	242 (534)
		PN25	730 (28.74)		36 (1.42)	660 (25.98)	700 (27.56)					300 (661)	298 (657)	302 (666)
		PN40	755 (29.72)		42 (1.65)	670 (26.38)	762 (30.00)					392 (864)	390 (860)	394 (869)
	JIS B2220	5K	655 (25.79)	16	25 (0.98)	605 (23.82)	600 (23.62)	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	190 (419)	188 (414)	192 (424)
		10K	675 (26.57)		27 (1.06)	620 (24.41)						290 (639)	288 (635)	292 (644)
	AS4087	PN16	705 (27.76)	16	26 (1.02)	641 (25.24)	600 (23.62)	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	435 (959)	433 (955)	437 (964)
		PN35	735 (28.94)	24	33 (1.30)	673 (26.50)						300 (661)	298 (657)	302 (666)
	ASME B16.5	CL150	700 (27.56)	20	32 (1.26)	635 (25.00)	762 (30.00)	458 (18.03)	449 (17.68)	608 (23.94)	30 (1.18)	490 (1080)	488 (1076)	492 (1085)
		CL300	775 (30.51)	24	35 (1.38)	659 (25.94)						300 (661)	298 (657)	302 (666)
DN600 (24 in)	EN 1092 or DIN	PN10	780 (30.71)	20	30 (1.18)	725 (28.54)	800	458 (18.03)	449 (17.68)	608 (23.94)	30 (1.18)	284 (626)	282 (622)	286 (631)
		PN16	840 (33.07)		36 (1.42)	770 (30.31)	(31.50)					318 (701)	316 (697)	320 (706)
		PN25	845 (33.27)		39 (1.54)	770 (30.31)	890					460 (1014)	458 (1010)	462 (1019)
		PN40	890 (35.04)		26 (1.02)	705 (27.76)	(35.04)					600 (1323)	598 (1318)	602 (1328)
	JIS B2220	5K	770 (30.31)	16	27 (1.06)	715 (28.15)	800 (31.50)	458 (18.03)	449 (17.68)	608 (23.94)	30 (1.18)	275 (606)	273 (602)	277 (611)
		10K	795 (31.30)		33 (1.30)	730 (28.74)						306 (675)	304 (670)	308 (679)
	AS4087	PN16	825 (32.48)	16	30 (1.18)	756 (29.76)	800 (31.50)	458 (18.03)	449 (17.68)	608 (23.94)	30 (1.18)	382 (842)	380 (838)	384 (847)
		PN35	850 (33.46)	24	36 (1.42)	781 (30.75)						452 (996)	450 (992)	454 (1001)
	ASME B16.5	CL300	915 (36.02)	24	41 (1.61)	813 (32.00)	800 (31.50)	458 (18.03)	449 (17.68)	608 (23.94)	30 (1.18)	550 (1213)	548 (1208)	552 (1217)
		CL150	815 (32.09)	20	35 (1.38)	750 (29.50)						425 (937)	423 (933)	427 (942)

F-style sensor – DN 700 to DN 2400 (28 to 96 in)

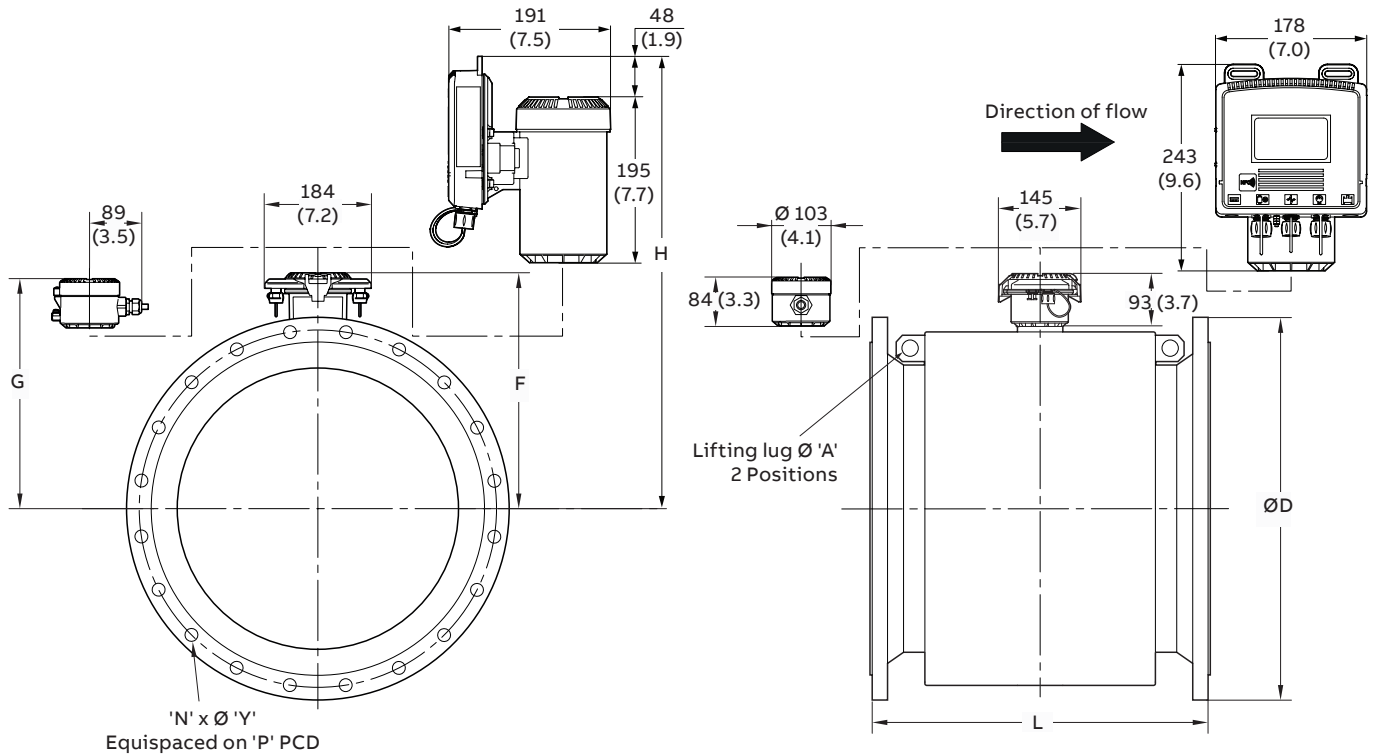


Figure 8 F-style sensor – DN 700 to DN 2400 (28 to 96 in)

Table 7 F-style sensor – DN 700 (28 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug	Integral FEW411/FEW431	Remote	Integral FEW451
			D	N	Y	P	L	F	G	H	A			
DN700 (28 in)	JIS	5K	875 (34.45)		27 (1.06)	820 (32.28)						213 (470)	211 (466)	215 (474)
		10K	905 (35.63)		33 (1.30)	840 (33.07)						251 (554)	249 (549)	253 (558)
		PN6	860 (33.86)		26 (1.02)	810 (31.89)	700 (27.56)					187 (413)	185 (408)	189 (417)
	EN 1092 or DIN	PN10	895 (35.24)	24	30 (1.18)	840 (33.07)						235 (519)	233 (514)	237 (523)
		PN16	910 (35.83)		36 (1.42)	840 (33.07)						270 (596)	268 (591)	272 (600)
		PN25	960 (37.80)		42 (1.65)	875 (34.45)	800 (31.50)					419 (924)	417 (920)	421 (929)
		PN40	995 (39.17)		48 (1.89)	900 (35.43)	910 (35.83)					632 (1394)	630 (1389)	634 (1398)
	AWWA C207	CLASS B	927 (36.50)		32 (1.26)	864 (34.02)	700 (27.56)					247 (545)	245 (541)	249 (549)
		CLASS D	927 (36.50)		32 (1.26)	864 (34.02)	700 (27.56)					270 (596)	268 (591)	272 (600)
		CLASS E	927 (36.50)	28	32 (1.26)	864 (34.02)		497 (19.57)	492 (19.37)	647 (25.47)	30 (1.18)	434 (957)	432 (953)	436 (962)
		CLASS F	1035 (40.75)		44 (1.73)	940 (37.01)	762 (30.00)					674 (1486)	672 (1482)	676 (1491)
	AS 4087	PN16	910 (35.83)	20	30 (1.18)	845 (33.27)	700 (27.56)					356 (785)	354 (781)	358 (790)
		PN35	935 (36.81)	24	36 (1.42)	857 (33.74)	910 (35.83)					584 (1288)	582 (1284)	586 (1292)
	AS 2129	TABLE D	910 (35.83)	20	30 (1.18)	845 (33.27)	910 (35.83)					308 (680)	306 (675)	310 (684)
		TABLE E			33 (1.30)		700 (27.56)					274 (605)	272 (600)	276 (609)
	ASME B16.5	CL150 SERIES A	925 (36.42)	28	35 (1.38)	864 (34.00)	790 (31.10)					454 (1001)	452 (997)	456 (1006)
		CL150 SERIES B	835 (32.87)	40	22 (0.87)	795 (31.31)	910 (35.83)					368 (812)	366 (807)	370 (816)
	ASME B16.5	CL300 SERIES A	1035 (40.75)	28	45 (1.75)	940 (37.00)	940 (37.01)					1002 (2210)	1000 (2205)	1004 (2214)
		CL300 SERIES B	920 (36.22)	36	35 (1.38)	857 (33.75)	910 (35.83)					680 (1500)	678 (1495)	682 (1504)

...Dimensions – sensors

...F-style sensor – DN 700 to DN 2400 (28 to 96 in)

Table 8 F-style sensor – DN 750 to DN 900 (30 to 36 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)						
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	T. box height	Lifting lug	Integral FEW411/ FEW431	Remote	Integral FEW451				
			D	N	Y	P	L	F	G	H	A							
DN750 (30 in)	JIS	JIS5K	945 (37.20)	24	33 (1.30)	880 (34.65)						245 (541)	243 (536)	247 (545)				
		JIS10K	970 (38.19)			900 (35.43)						317 (699)	315 (695)	319 (704)				
	AWWA C207	CLASS B	984 (38.74)	28	32 (1.26)	914 (35.98)	762 (30.00)					268 (591)	266 (587)	270 (596)				
		CLASS D	984 (38.74)									322 (710)	320 (706)	324 (715)				
		CLASS E	984 (38.74)									472 (1041)	470 (1037)	474 (1045)				
		CLASS F	1092 (42.99)									755 (1665)	753 (1661)	757 (1669)				
	AS 4087	PN16	995 (39.17)	20	33 (1.30)	927 (36.50)		523 (20.59)	518 (20.39)	673 (26.5)	30 (1.18)	410 (904)	408 (900)	412 (909)				
		PN35	1015 (39.96)	28	36 (1.42)	940 (37.01)						713 (1572)	711 (1568)	715 (1577)				
	AS 2129	TABLE D	995 (39.17)	20	33 (1.30)	927 (36.50)	990 (38.98)					390 (860)	388 (856)	392 (865)				
		TABLE E	995 (39.17)									350 (772)	348 (768)	352 (777)				
	ASME B16.5	CL150 SERIES A	985 (38.78)	28	35 (1.38)	914 (36.00)	830 (32.67)					505 (1114)	503 (1109)	507 (1118)				
		CL150 SERIES B	885 (34.84)	44	22 (0.87)	846 (33.31)	990 (38.98)					368 (812)	366 (807)	370 (816)				
ASME B16.5	CL300 SERIES A	1090 (42.91)	28	48 (1.87)	997 (39.25)	975 (38.39)					1002 (2210)	1000 (2205)	1004 (2214)					
	CL300 SERIES B	990 (38.98)	36	38 (1.50)	921 (36.25)	990 (38.98)					797 (1758)	795 (1753)	799 (1762)					
DN800 (32 in)	JIS	JIS5K	995 (39.17)	24	33 (1.30)	930 (36.61)	800 (31.50)					280 (618)	278 (613)	282 (622)				
		JIS10K	1020 (40.16)	28	33 (1.30)	950 (37.40)						328 (724)	326 (719)	330 (728)				
	EN 1092 or DIN	PN6	975 (38.39)	24	30 (1.18)	920 (36.22)						239 (527)	237 (523)	241 (532)				
		PN10	1015 (39.96)	34	33 (1.30)	950 (37.40)						312 (688)	310 (684)	314 (693)				
		PN16	1025 (40.35)	24	39 (1.54)	950 (37.40)	800 (31.50)					366 (807)	364 (803)	368 (812)				
		PN25	1085 (42.72)		48 (1.89)	990 (38.98)	950 (37.40)					599 (1321)	597 (1317)	601 (1325)				
		PN40	1140 (44.88)		56 (2.20)	1030 (40.55)	1040 (40.94)					919 (2027)	917 (2022)	921 (2031)				
		AWWA C207	CLASS B	1060 (41.73)	28	38 (1.50)	978 (38.50)					800 (31.50)		547 (21.54)	542 (21.34)	697 (27.44)	30 (1.18)	334 (737)
	CLASS D		1060 (41.73)	394 (869)				392 (865)	396 (874)									
	CLASS E		1060 (41.73)	591 (1303)				589 (1299)	593 (1308)									
	CLASS F		1150 (45.28)	886 (1954)				884 (1949)	888 (1958)									
	AS 4087	PN16	1060 (41.73)	20	36 (1.42)	984 (38.74)	800 (31.50)	482 (1063)	480 (1059)	484 (1068)								
		PN35	1060 (41.73)	28	36 (1.42)	984 (38.74)	1040 (40.94)	802 (1769)	800 (1764)	804 (1773)								
	AS2129	TABLE D	1060 (41.73)	1040 (40.94)			440 (971)	438 (966)	442 (975)									
		TABLE E	1060 (41.73)	20			800 (31.50)	410 (904)	408 (900)	412 (909)								
	ASME B16.5	CL150 SERIES A	1060 (41.73)	28	41 (1.63)	978 (38.50)	950 (37.40)					674 (1486)	672 (1482)	676 (1491)				
		CL150 SERIES B	940 (37.01)	48	22 (0.87)	900 (35.44)	1040 (40.94)					456 (1006)	454 (1001)	458 (1010)				
ASME B16.5	CL300 SERIES A	1150 (45.28)	28	51 (2.01)	1054 (41.50)	1120 (44.09)					1219 (2688)	1217 (2684)	1221 (2692)					
	CL300 SERIES B	1055 (41.54)	32	41 (1.63)	978 (38.50)	1040 (40.94)					985 (2172)	983 (2168)	987 (2176)					
DN900 (36 in)	JIS	JIS5K	1095 (43.11)	24	33 (1.30)	1030 (40.55)	900 (35.43)					347 (766)	345 (761)	349 (770)				
		JIS10K	1120 (44.09)	28	33 (1.30)	1050 (41.34)						419 (924)	417 (920)	421 (929)				
	EN 1092 or DIN	PN6	1075 (42.32)	24	30 (1.18)	1020 (40.16)						300 (662)	298 (657)	302 (666)				
		PN10	1115 (43.90)	28	33 (1.30)	1050 (41.34)						396 (874)	394 (869)	398 (878)				
		PN16	1125 (44.29)		39 (1.54)	1050 (41.34)						485 (1070)	483 (1065)	487 (1074)				
		PN25	1185 (46.65)		48 (1.89)	1090 (42.91)	1040 (40.94)					757 (1669)	755 (1665)	759 (1674)				
		PN40	1250 (49.21)		56 (2.20)	1140 (44.88)	1170 (46.06)					1219 (2688)	1217 (2684)	1221 (2692)				
	AWWA C207	CLASS B	1168 (45.98)	32	38 (1.50)	1086 (42.76)	900 (35.43)		598 (23.54)	593 (23.35)	748 (29.45)	30 (1.18)	397 (876)	395 (871)	399 (880)			
		CLASS D											436 (962)	434 (957)	438 (966)			
		CLASS E											744 (1641)	742 (1636)	746 (1645)			
		CLASS F											1064 (2346)	1062 (2342)	1066 (2351)			
	AS 4087	PN16	1175 (46.26)	24	36 (1.42)	1092 (42.99)	1170 (46.06)						686 (1513)	684 (1508)	688 (1517)			
		PN35	1185 (46.65)	32	39 (1.54)	1105 (43.50)							1103 (2432)	1101 (2428)	1105 (2437)			
	AS 2129	TABLE D	1175 (46.26)	24	36 (1.42)	1092 (42.99)	1170 (46.06)	574 (1266)					572 (1262)	576 (1270)				
		TABLE E					900 (35.43)	580 (1279)					578 (1275)	582 (1284)				
	ASME B16.5	CL150 SERIES A	1170 (46.06)	32	41.3 (1.63)	1086 (42.75)	1120 (44.09)					933 (2057)	931 (2053)	935 (2062)				
		CL150 SERIES B	1055 (41.54)	44	25.4 (1.00)	1010 (39.75)	1170 (46.06)					655 (1445)	653 (1440)	657 (1449)				
ASME B16.5	CL300 SERIES A	1270 (50.00)	32	54 (2.13)	1168 (46.00)	1180 (46.46)					1533 (3380)	1531 (3376)	1535 (3385)					
	CL300 SERIES B	1170 (46.06)		44.5 (1.75)	1089 (42.87)	1170 (46.06)					1206 (2659)	1204 (2655)	1208 (2664)					

...F-style sensor – DN 700 to DN 2400 (28 to 96 in)

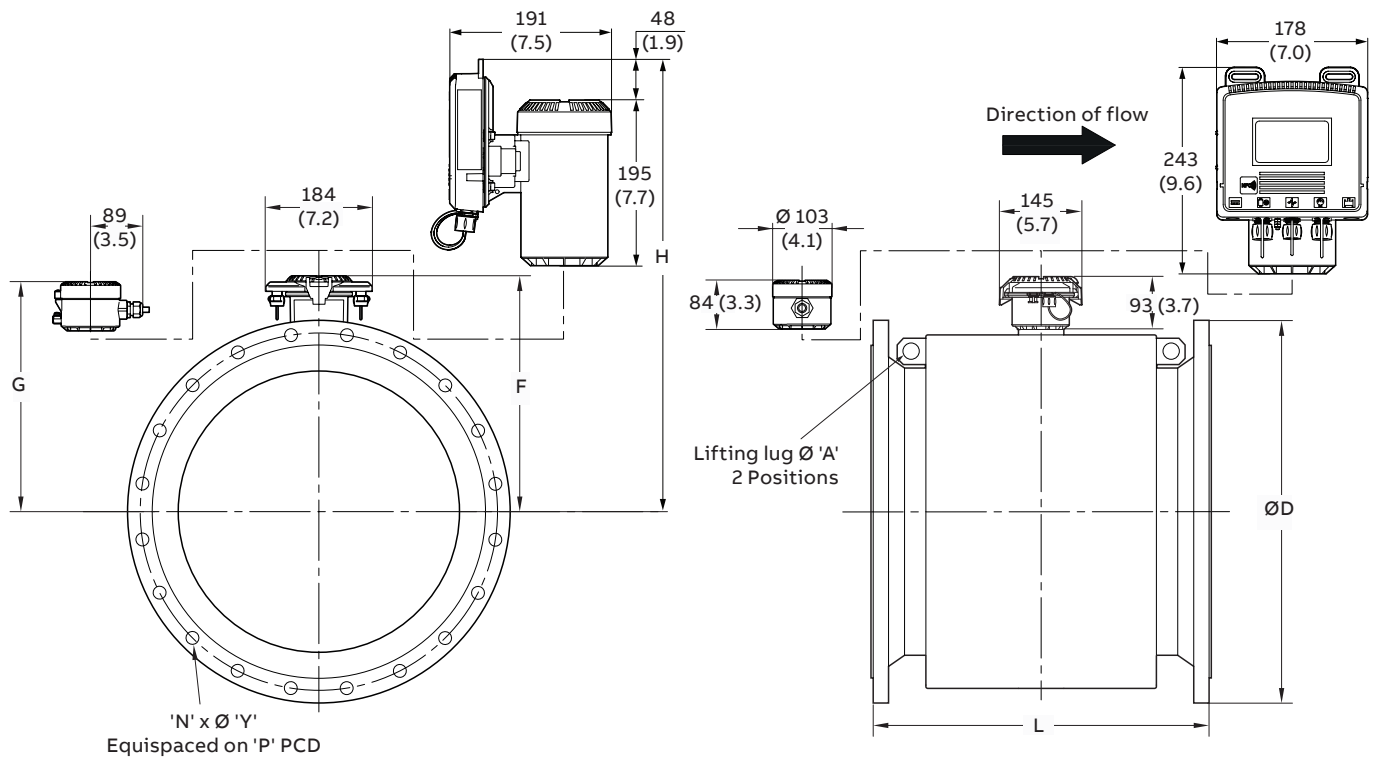


Figure 9 F-style sensor – DN 700 to DN 2400 (28 to 96 in)

Table 9 F-style sensor – DN 1000 (40 in)

Sensor size	Flange		Dimensional in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Trans height	Tx. box height	Tx. box height	Lifting lug	Integral FEW411/FEW431	Remote	Integral FEW451
			D	N	Y	P	L	F	G	H	A			
DN1000 (40 in)	JIS	JIS5K	1195 (47.05)		33 (1.30)	1130 (44.49)						407 (898)	405 (893)	409 (902)
		JIS10K	1235 (48.62)		39 (1.54)	1160 (45.67)						505 (1114)	503 (1109)	507 (1118)
	EN 1092 or DIN	PN6	1175 (46.26)		30 (1.18)	1120 (44.09)	1000 (39.37)					348 (768)	346 (763)	350 (772)
		PN10	1230 (48.43)	28	36 (1.42)	1160 (45.67)						469 (1034)	467 (1030)	471 (1039)
		PN16	1255 (49.41)		42 (1.65)	1170 (46.06)						613 (1352)	611 (1348)	615 (1356)
		PN25	1320 (51.97)			1210 (47.64)	1170 (46.06)					1004 (2214)	1002 (2210)	1006 (2218)
		PN40	1360 (53.54)		56 (2.20)	1250 (49.21)	1300 (51.18)					1486 (3277)	1484 (3272)	1488 (3281)
		CLASS B	1289 (50.75)									474 (1045)	472 (1041)	476 (1050)
	AWWA C207	CLASS D	1289 (50.75)	36	38 (1.50)	1200 (47.24)						618 (1363)	616 (1359)	620 (1367)
		CLASS E	1289 (50.75)				1000 (39.37)	648 (25.51)	643 (25.31)	798 (31.42)	30 (1.18)	922 (2033)	920 (2029)	924 (2038)
		CLASS F	1378 (54.25)		51 (2.01)	1276 (50.24)						1300 (2867)	1298 (2862)	1302 (2871)
		PN16	1255 (49.41)	24	36 (1.42)	1175 (46.26)						740 (1632)	738 (1628)	742 (1636)
	AS 4087	PN35	1275 (50.20)	36	39 (1.54)	1194 (47.01)	1300 (51.18)					1316 (2902)	1314 (2897)	1318 (2906)
		TABLE D	1255 (49.41)	24	36 (1.42)		1300 (51.18)					682 (1504)	680 (1500)	684 (1508)
	AS 2129	TABLE E	1255 (49.41)		39 (1.54)	1175 (46.26)	1000 (39.37)					652 (1438)	650 (1434)	654 (1442)
		CL150 SERIES A	1290 (50.79)	36	41 (1.63)	1200 (47.25)	1090 (42.91)					1034 (2280)	1032 (2276)	1036 (2284)
	ASME B16.5	CL150 SERIES B	1175 (46.26)	44	29 (1.13)	1121 (44.13)	1300 (51.18)					809 (1784)	807 (1780)	811 (1788)
		CL300 SERIES A	1240 (48.82)	32	45 (1.75)	1156 (45.50)	1150 (45.28)					1287 (2838)	1285 (2833)	1289 (2842)
	ASME B16.5	CL300 SERIES B	1275 (50.20)	40		1191 (46.87)	1300 (51.18)					1560 (3440)	1558 (3435)	1562 (3444)

...Dimensions – sensors

...F-style sensor – DN 700 to DN 2400 (28 to 96 in)

Table 10 F-style sensor – DN 1050 to DN 1400 (42 to 56 in)

Sensor size	Flange		Dimensional in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Trans height	Tx. height	Tx. height	Lifting lug			
			D	N	Y	P	L	F	G	H	A	Integral FEW411/ FEW431	Remote	Integral FEW451
DN1050 (42 in)	AWWA C207	CLASS B										559 (1233)	557 (1228)	561 (1237)
		CLASS D	1346 (52.99)		38 (1.50)	1257 (49.49)						614 (1354)	612 (1350)	616 (1359)
		CLASS E					1067 (42.01)					1102 (2430)	1100 (2426)	1104 (2434)
		CLASS F	1448 (57.01)	36	51 (2.01)	1340 (52.76)						1522 (3356)	1520 (3352)	1524 (3360)
	ASME B16.5	CL150 SERIES A	1345 (52.95)		41.3 (1.63)	1257 (49.50)		701 (27.6)	697 (27.44)	851 (33.5)	30 (1.18)	1200 (2646)	1198 (2642)	1202 (2650)
		CL150 SERIES B	1225 (48.23)	48	28.6 (1.13)	1172 (46.13)	1365 (53.74)					910 (2007)	908 (2002)	912 (2011)
	ASME B16.5	CL300 SERIES A	1290 (50.79)	32	44.5 (1.75)	1207 (47.50)	1170 (46.06)					1432 (3158)	1430 (3153)	1434 (3162)
		CL300 SERIES B	1335 (52.56)	36	47.6 (1.87)	1245 (49.00)	1365 (53.74)					1804 (3978)	1802 (3973)	1806 (3982)
DN1100 (44 in)	JIS	JIS5K	1305 (51.38)	28	33 (1.30)	1240 (48.82)						478 (1054)	476 (1050)	480 (1059)
		JIS10K	1345 (52.95)		39 (1.54)	1270 (50.00)						679 (1497)	677 (1493)	681 (1502)
	AWWA C207	CLASS B	1403 (55.24)		38 (1.50)	1315 (51.77)	1118 (44.02)	701 (27.60)	697 (27.44)	851 (33.5)	30 (1.18)	605 (1334)	603 (1330)	607 (1339)
		CLASS D	1403 (55.24)	40								695 (1533)	693 (1528)	697 (1537)
		CLASS E	1404 (55.28)	40	38 (1.50)							1132 (2496)	1130 (2492)	1134 (2501)
		CLASS F	1505 (59.25)	36	51 (2.01)	1397 (55.00)						1640 (3616)	1638 (3612)	1642 (3620)
DN1200 (48 in)	JIS	5K	1420 (55.91)		33 (1.30)	1350 (53.15)						653 (1440)	651 (1436)	655 (1445)
		10K	1465 (57.68)		39 (1.54)	1380 (54.33)						819 (1806)	817 (1802)	821 (1810)
	EN 1092 or DIN	PN6	1405 (55.31)		33 (1.30)	1340 (52.76)	1200 (47.24)					538 (1187)	536 (1182)	540 (1191)
		PN10	1455 (57.28)	32	39 (1.54)	1380 (54.33)						753 (1661)	751 (1656)	755 (1665)
		PN16	1485 (58.46)		48 (1.89)	1390 (54.72)						981 (2163)	979 (2159)	983 (2168)
		PN25	1530 (60.24)		56 (2.20)	1420 (55.91)						1654 (3647)	1652 (3643)	1656 (3651)
		PN40	1575 (62.01)		62 (2.44)	1460 (57.48)	1560 (61.42)					2229 (4915)	2227 (4910)	2231 (4919)
												746 (1645)	744 (1641)	748 (1650)
	AWWA C207	CLASS B	1511 (59.49)		38 (1.50)	1422 (55.98)						886 (1954)	884 (1949)	888 (1958)
		CLASS D	1511 (59.49)	44	38 (1.50)	1422 (55.98)	1200 (47.24)	753 (29.65)	748 (29.49)	903 (35.55)	30 (1.18)	1389 (3063)	1387 (3058)	1391 (3067)
		CLASS E	1511 (59.49)									2300 (5071)	2298 (5067)	2302 (5076)
		CLASS F	1651 (65.00)	40	51 (2.01)	1543 (60.75)						2300 (5071)	2298 (5067)	2302 (5076)
	AS 4087	PN16	1490 (58.66)	32	36 (1.42)		1200 (47.24)					1207 (2661)	1205 (2657)	1209 (2666)
	AS 2129	TABLE-D	1490 (58.66)	32	36 (1.42)	1410 (55.51)	1560 (61.42)					1118 (2465)	1116 (2461)	1120 (2470)
		TABLE-E	1490 (58.66)	32	39 (1.54)		1200 (47.24)					1085 (2393)	1083 (2388)	1087 (2397)
	AS 4087	PN35	1530 (60.24)	40	42 (1.65)	1441 (56.73)	1560 (61.42)					2211 (4875)	2209 (4871)	2213 (4879)
	ASME CL150	SERIES A	1510 (59.45)		41 (1.63)	1422 (56.00)	1320 (51.97)					1612 (3554)	1610 (3550)	1614 (3559)
		SERIES B	1390 (54.72)	44	32 (1.25)	1335 (52.56)	1560 (61.42)					1178 (2598)	1176 (2593)	1180 (2602)
	ASME CL300	SERIES A	1465 (57.68)	32	51 (2.01)	1372 (54.00)	1400 (55.12)					2051 (4522)	2049 (4518)	2053 (4527)
		SERIES B	1510 (59.45)	40	51 (2.01)	1416 (55.75)	1560 (61.42)					2446 (5393)	2444 (5389)	2448 (5397)
DN1350 (54 in)	AWWA C207	CLASS B										942 (2077)	940 (2073)	944 (2082)
		CLASS D	1683 (66.26)	44	44 (1.73)	1594 (62.76)	1350 (53.15)	848 (33.39)	843 (33.19)	998 (39.29)	45 (1.77)	1026 (2262)	1024 (2258)	1028 (2267)
		CLASS E										1834 (4044)	1832 (4039)	1836 (4048)
DN1400 (56 in)	EN 1092 or DIN	PN6	1630 (64.17)		36 (1.42)	1560 (61.42)						774 (1707)	772 (1702)	776 (1711)
		PN10	1675 (65.94)		42 (1.65)		1400 (55.12)					1080 (2381)	1078 (2377)	1082 (2386)
		PN16	1685 (66.34)	36	48 (1.89)	1590 (62.60)						1293 (2851)	1291 (2847)	1295 (2855)
		PN25	1755 (69.09)		62 (2.44)	1640 (64.57)						2483 (5475)	2481 (5470)	2485 (5479)
		PN40	1795 (70.67)		62 (2.44)	1680 (66.14)	1820 (71.65)	848 (33.39)	843 (33.19)	998 (39.29)	45 (1.77)	3202 (7060)	3200 (7055)	3204 (7064)
	ASME CL150	SERIES A	1745 (68.70)	48	48 (1.87)	1651 (65.00)	1500 (59.06)					2365 (5214)	2363 (5210)	2367 (5219)
		SERIES B	1600 (62.99)	60	32 (1.25)	1543 (60.75)	1820 (71.65)					1706 (3762)	1704 (3757)	1708 (3766)
	ASME CL300	SERIES A	1710 (67.32)	28	60 (2.37)	1600 (63.00)	1600 (62.99)					3166 (6980)	3164 (6976)	3168 (6985)
		SERIES B	1765 (69.49)	36	60 (2.37)	1651 (65.00)	1820 (71.65)					3873 (8539)	3871 (8535)	3875 (8543)

...Dimensions – sensors

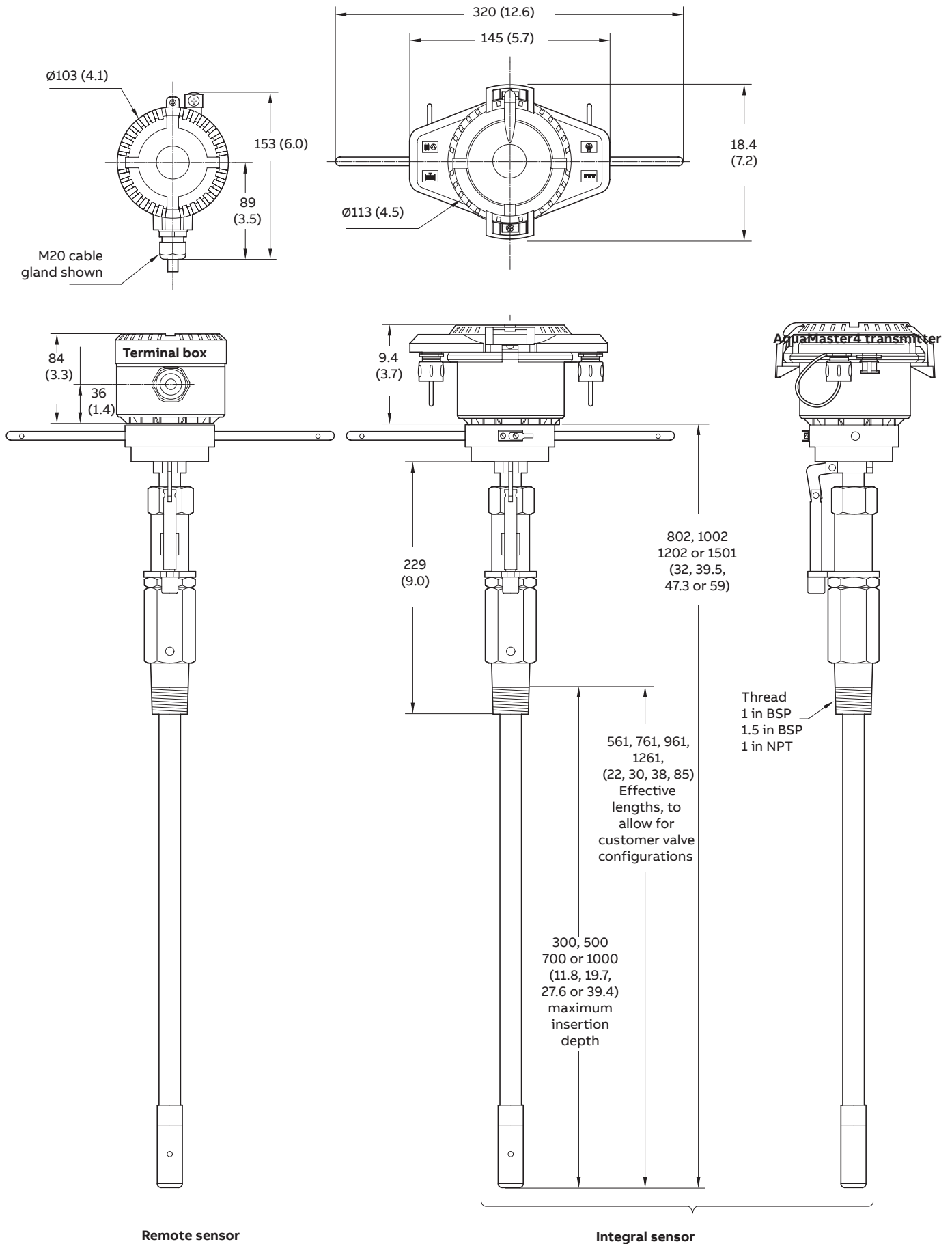
...F-style sensor – DN 700 to DN 2400 (28 to 96 in)

Table 11 F-style sensor – DN 1050 to DN 2400 (60 to 96 in)

Sensor size	Flange		Dimensional in mm (in)										Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. Holes	Bolt Hole Dia	Bolt Hole PCD	Sensor length	Trans Height	Tx. Height	Tx. Height	Lifting Lug	Integral FEW411/ FEW431	Remote	Integral FEW451	
			D	N	Y	P	L	F	G	H	A				
DN1500 (60 in)	JIS	5K	1730 (68.11)	36	33 (1.30)	1660 (65.35)						1137 (2507)	1135 (2503)	1139 (2512)	
		10K	1795 (70.67)	40	45 (1.77)	1700 (66.93)						1568 (3457)	1566 (3453)	1570 (3462)	
	AWWA C207	CLASS B	1854 (72.99)									1290 (2844)	1288 (2840)	1292 (2849)	
		CLASS D	1854 (72.99)		44 (1.73)		1524 (60.00)					1569 (3460)	1567 (3455)	1571 (3464)	
		CLASS E	1854 (72.99)			1759 (69.25)		958 (37.72)	953 (37.52)	1108 (43.62)	45 (1.77)	2497 (5505)	2495 (5501)	2499 (5510)	
	ASME CL150	SERIES A	1855 (73.03)		47.6 (1.87)							2847 (6277)	2845 (6273)	2849 (6281)	
		SERIES B	1725 (67.91)		35 (1.38)	1662 (65.44)	1950 (76.77)					2031 (4478)	2029 (4474)	2033 (4482)	
	ASME CL300	SERIES A	1810 (71.26)	32	60 (2.37)	1702 (67.00)	1640 (64.57)					3717 (8195)	3715 (8191)	3719 (8199)	
		SERIES B	1880 (74.02)	40	60 (2.37)	1764 (69.44)	1950 (76.77)					4181 (9218)	4179 (9214)	4183 (9222)	
	DN1600 (64 in)	EN 1092 or DIN	PN6	1830 (72.05)		36 (1.42)	1760 (69.29)						1033 (2278)	1031 (2273)	1035 (2282)
PN10			1915 (75.39)		48 (1.89)	1820 (71.65)	1600 (62.99)					1509 (3327)	1507 (3323)	1511 (3332)	
PN16			1975 (77.76)	40	56 (2.20)	1820 (71.65)		959 (37.76)	954 (37.56)	1109 (43.66)	45 (1.77)	1955 (4311)	1953 (4306)	1957 (4315)	
PN25			1930 (75.98)		62 (2.44)	1860 (73.23)	2080 (81.89)					3201 (7057)	3199 (7053)	3203 (7062)	
PN40			2025 (79.72)		70 (2.76)	1900 (74.80)						4375 (9646)	4373 (9641)	4377 (9650)	
DN1650 (66 in)	AWWA C207	CLASS B	2032 (80.00)	52	44(1.75)	1930(75.98)	1650 (64.96)	1009 (39.72)	1004 (39.53)	1159 (45.63)	45 (1.77)	1497 (3301)	1495 (3296)	1499 (3305)	
		CLASS D	2032 (80.00)									1763 (3887)	1761 (3883)	1765 (3892)	
DN1800 (72 in)	EN 1092 or DIN	PN6	2045 (80.51)		39 (1.54)	1970 (77.56)						1356 (2990)	1354 (2986)	1358 (2994)	
		PN10	2115 (83.27)		48 (1.89)	2020 (79.53)	1800 (70.87)					1949 (4297)	1947 (4293)	1951 (4302)	
		PN16	2130 (83.86)	44	56 (2.20)	2020 (79.53)		1074 (42.28)	1069 (42.09)	1224 (48.19)	45 (1.77)	2524 (5565)	2522 (5561)	2526 (5569)	
		PN25	2195 (86.42)		70 (2.76)	2070 (81.50)	2340 (92.12)	(42.28)	(42.09)	(48.19)	(1.77)	4422 (9749)	4420 (9745)	4424 (9754)	
	AWWA C207	CLASS B										1833 (4042)	1831 (4037)	1835 (4046)	
		CLASS D	2197 (86.50)	60	44 (1.73)	2096 (82.52)	1800 (70.87)					2147 (4734)	2145 (4729)	2149 (4738)	
DN1950 (78 in)	AWWA C207	CLASS B						1184 (46.61)	1179 (46.42)	1334 (52.52)	45 (1.77)	2312 (5098)	2310 (5093)	2314 (5102)	
		CLASS D	2362 (92.99)	64	51(2.01)	2261(89.02)	1950 (76.77)					2684 (5918)	2682 (5913)	2686 (5922)	
DN2000 (80 in)	EN 1092 or DIN	PN6	2265 (89.17)		42 (1.65)	2180 (85.83)						1781 (3927)	1779 (3923)	1783 (3931)	
		PN10	2325 (91.54)		48 (1.89)	2230 (87.80)	2000 (78.74)					2580 (5688)	2578 (5684)	2582 (5693)	
		PN16	2345 (92.32)	48	62 (2.44)	2230 (87.80)		1184 (46.61)	1179 (46.42)	1334 (52.52)	45 (1.77)	3230 (7121)	3228 (7117)	3232 (7126)	
		PN25	2425 (95.47)		70 (2.76)	2300 (90.55)	2600 (102.36)					5896 (12999)	5894 (12995)	5898 (13003)	
DN2100 (84 in)	AWWA C207	CLASS B						1288 (50.71)	1283 (50.51)	1438 (56.61)	45 (1.77)	2570 (5666)	2568 (5662)	2572 (5671)	
		CLASS D	2534 (99.76)	64	51(2.01)	2426 (95.51)	2100 (82.68)					2942 (6486)	2940 (6482)	2944 (6491)	
DN2200 (88 in)	EN 1092 or DIN	PN6	2475 (97.44)		42 (1.65)	2390 (94.09)						2446 (5393)	2444 (5389)	2448 (5397)	
		PN10	2550 (100.39)	52	56 (2.20)	2440 (96.06)	2200 (86.61)	1288 (50.71)	1283 (50.51)	1438 (56.61)	45 (1.77)	3202 (7060)	3200 (7055)	3204 (7064)	
DN2400 (96 in)	EN 1092 or DIN	PN6	2685 (105.71)		42 (1.65)	2600 (102.36)						2846 (6275)	2844 (6270)	2848 (6279)	
		PN10	2760 (108.66)	56	56 (2.20)	2650 (104.33)	2400 (94.49)	1388 (54.65)	1283 (50.51)	1538 (60.55)	45 (1.77)	4111 (9064)	4109 (9059)	4113 (9068)	

Table 12 F-style sensor – DN 1500 to DN 2400 (42 to 96 in)

Dimensions – insertion flowmeter

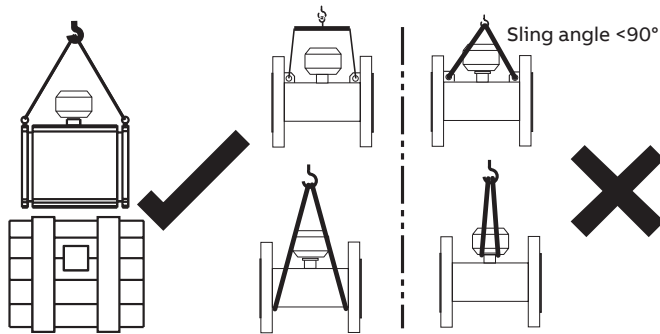


Installation requirements – sensor

This section is intended to give an overview of installation of a flowmeter. For Installation requirements, technical information and Health and Safety precautions refer to User Guide [OI/FER100/FER200-EN](#).

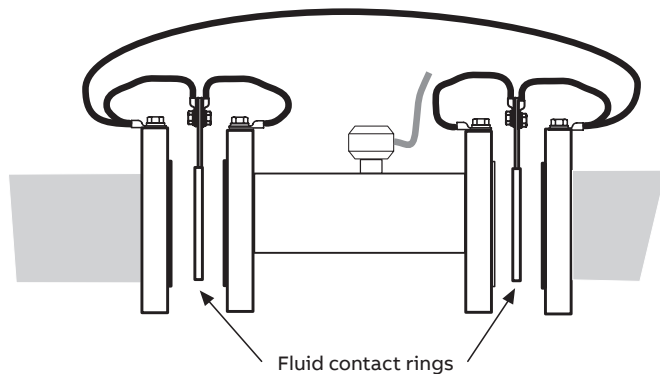
Unpacking the flowmeter

Care must be taken when lifting the flowmeter to use the lifting hooks provided or sling under the body of the meter. Never lift the flowmeter using the terminal connection box of the sensor cable as this causes damage and invalidates the warranty.

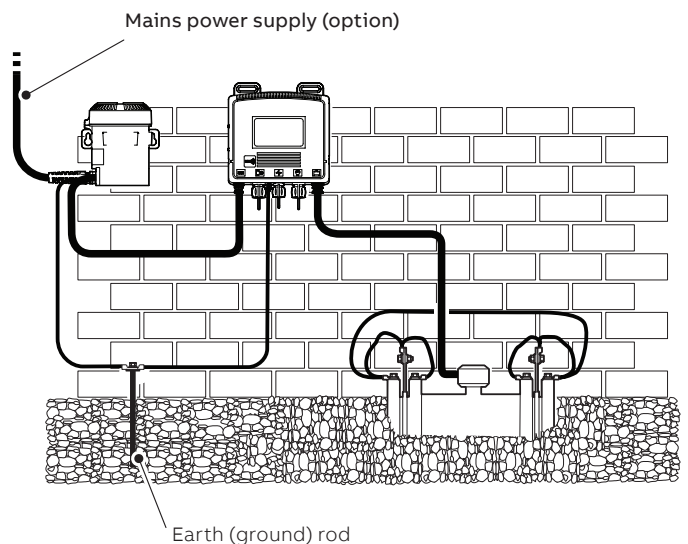
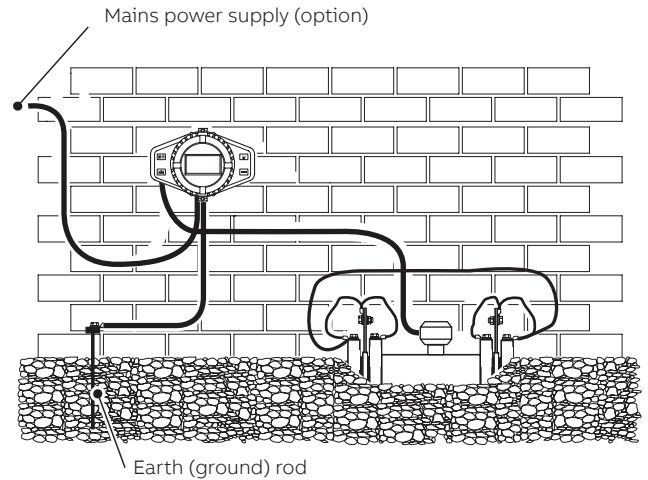


Grounding

The flowmeter sensor must be cross-bonded to the upstream and downstream pipes. For technical reasons, this potential must be identical to the potential of the metering fluid. The fluid connection is made by installing 2 fluid contact rings (for grounding).

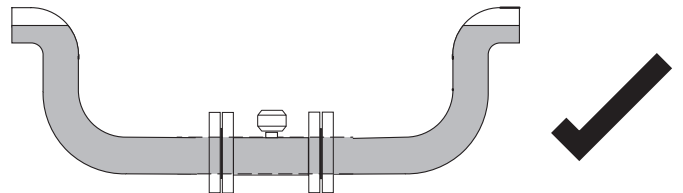


Note. The grounding arrangements shown below are applicable to both cathodic and non-cathodic protected installations.



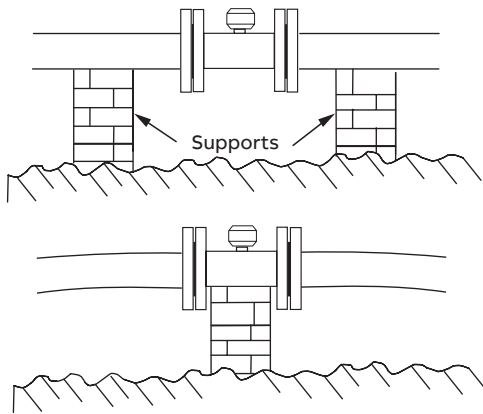
Mounting

The installation conditions shown below must be observed to achieve the best operational results. The sensor tube must always be completely full.

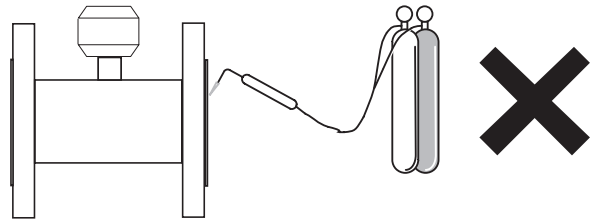


The flow direction must correspond to the identification plate. The flowmeter measures the flowrate in both directions. Forward flow is the factory setting.

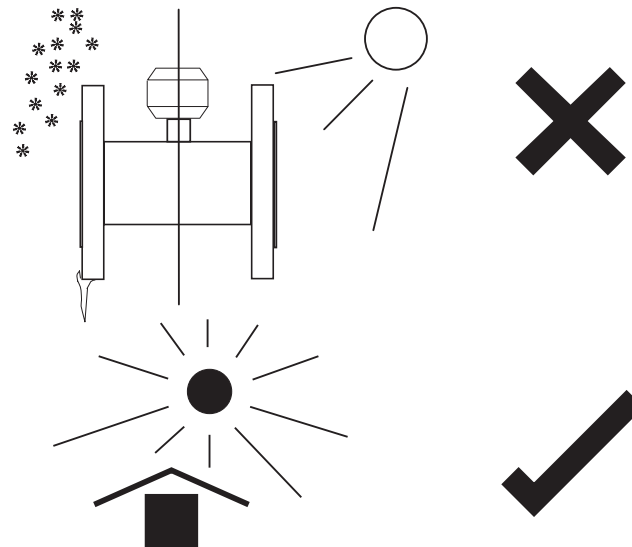
The flowmeter must be installed without mechanical tension (torsion, bending). If necessary, support the pipeline.



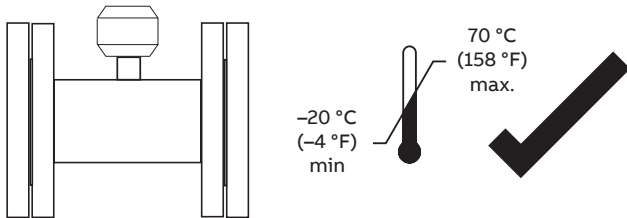
The flowmeter must not be submitted to localized heating during installation; take care to remember this is a measuring instrument.



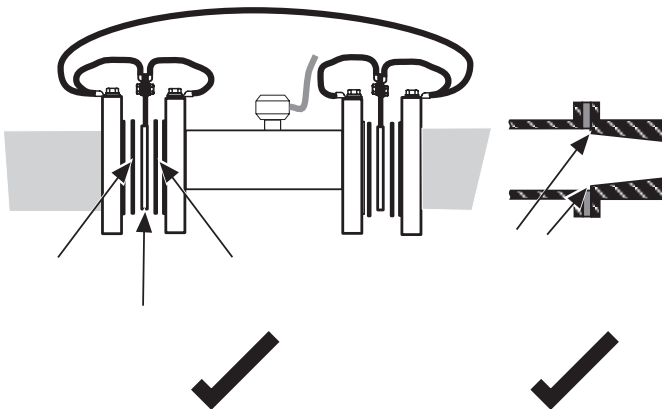
The flowmeter must not be exposed to direct sunlight. Provide appropriate sun protection where necessary.



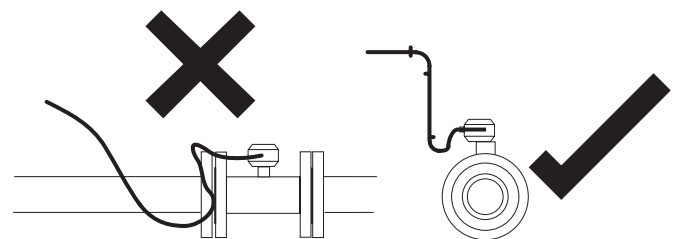
The flange seal material must be compatible with the fluid and fluid temperatures.



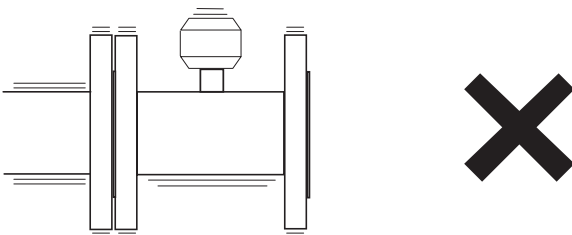
Seals must not extend into the flow area as this causes turbulence that adversely influences flowmeter accuracy.



The cable to the flowmeter must be installed neatly or within a conduit. Both loose or conduit installations must have a u-bend below terminal connection box height to enable any water to run off thus avoiding any capillary action into the flowmeter sensor.

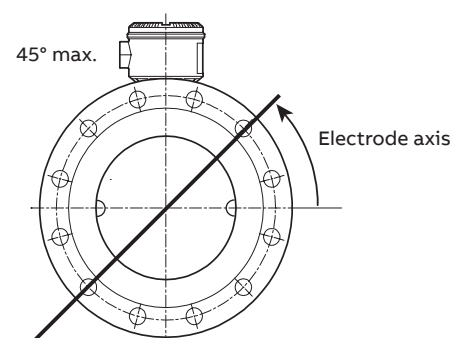


The pipeline must not exert any forces and torques on the flowmeter (for example, vibration).



Electrode axis

The electrode axis must be horizontal wherever possible or no more than 45° from horizontal.



Installation requirements – transmitter (41X/43X)

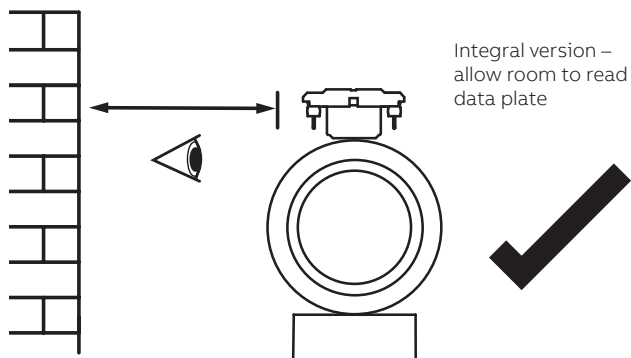


Figure 11 Siting

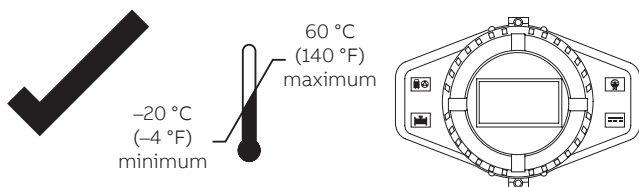


Figure 12 Within temperature limits

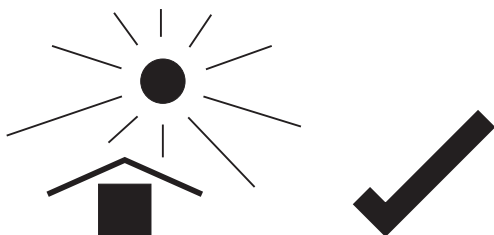


Figure 13 Shade

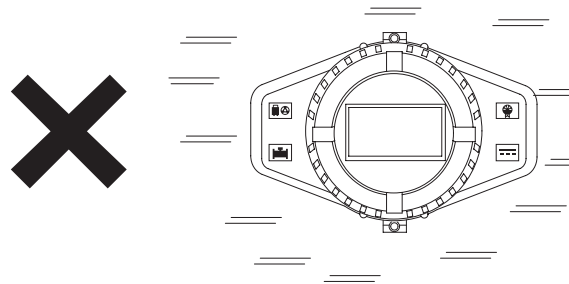


Figure 14 Vibration

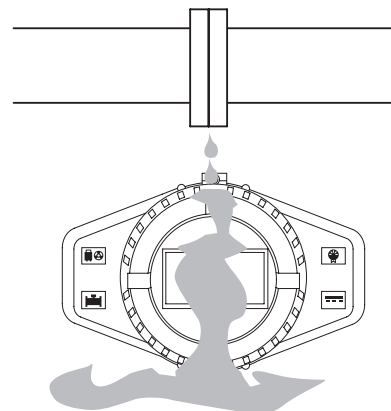


Figure 15 Spillage

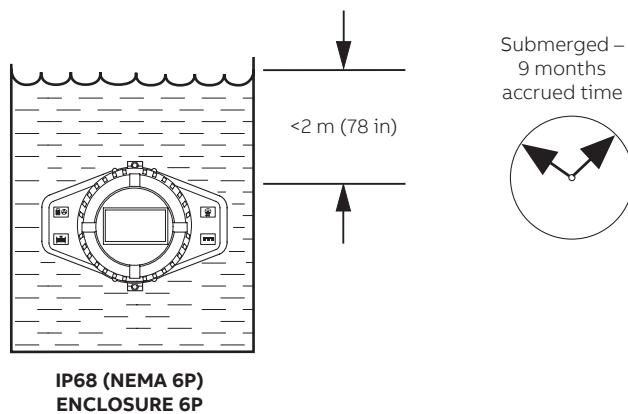


Figure 16 Within environmental rating

Installation conditions – FET 450

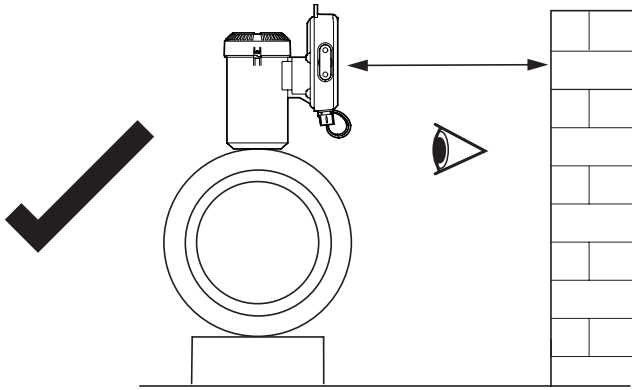


Figure 17 Siting

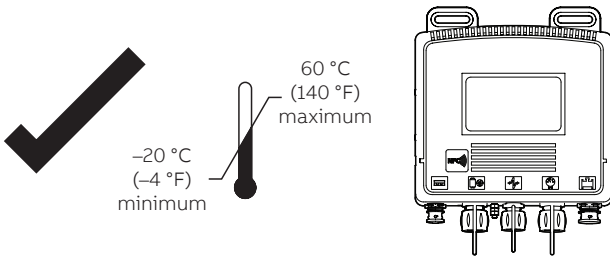


Figure 18 Within temperature limits

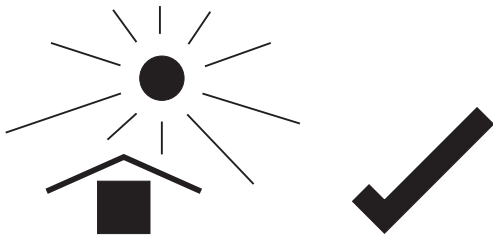


Figure 19 Shade



Figure 20 Vibration

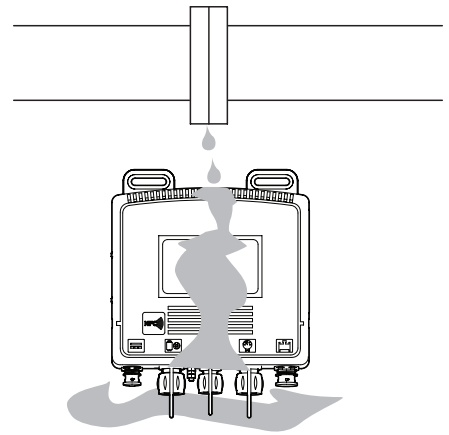
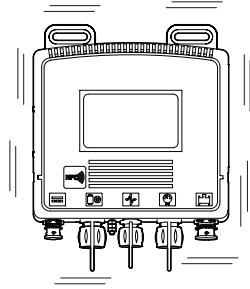


Figure 21 Spillage

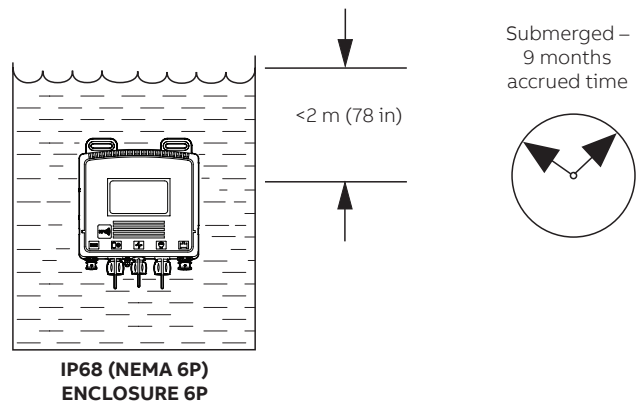


Figure 22 Within environmental rating

...Installation requirements – FET 450

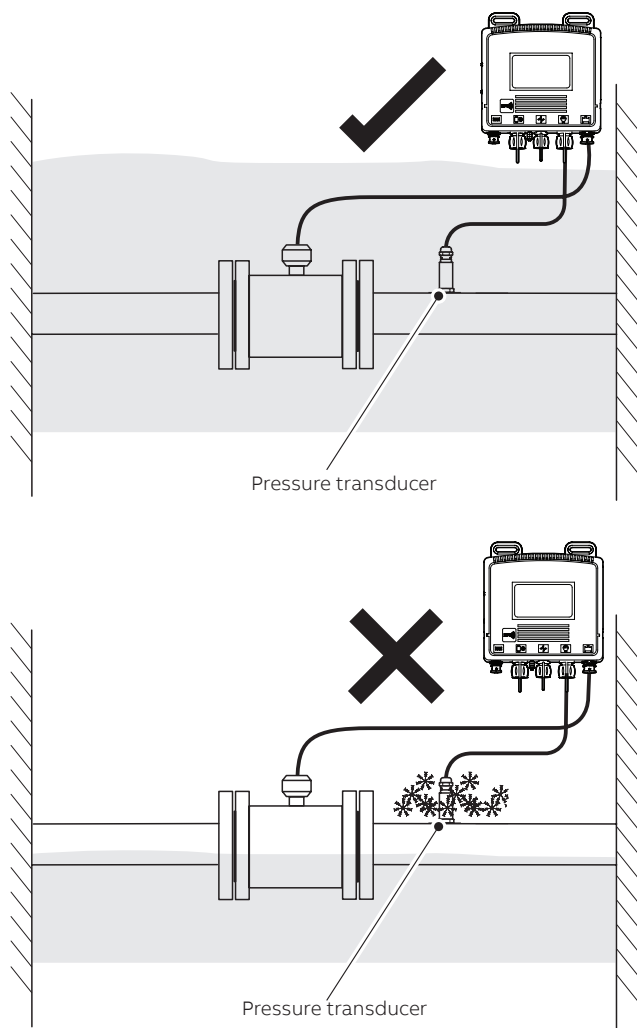


Figure 23 Pressure transducer – protect from frost

For access to display and communication

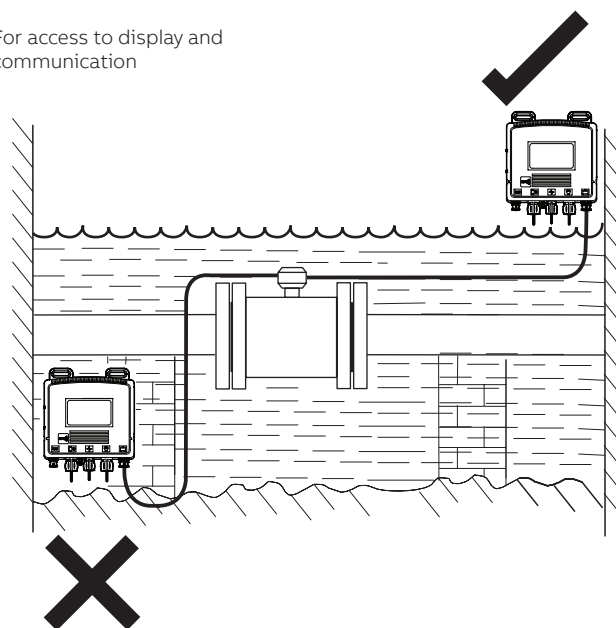


Figure 24 Access to transmitter

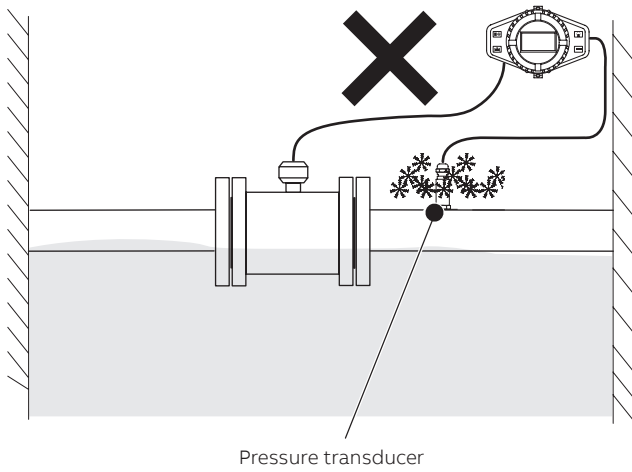
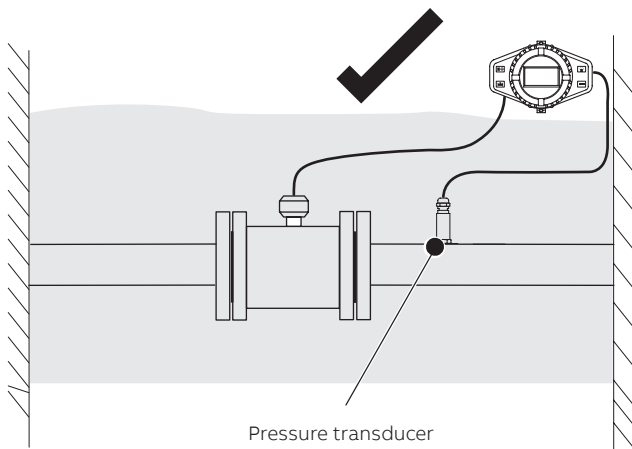


Figure 25 Pressure transducer – protect from frost

For access to display and communication

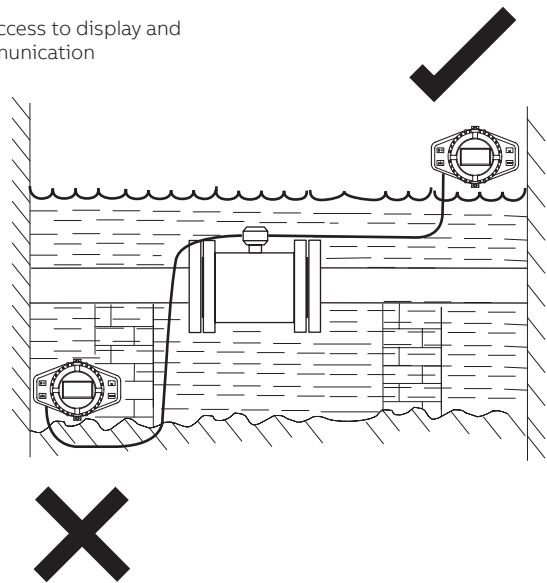


Figure 26 Access to transmitter

AquaMaster4 series differences

	Features	AquaMaster4		
		41X (standard)	43X (advanced)	45X (premium)
Mounting	Integral	✓	✓	✓
	Remote	✓	✓	✓
Sensors	Full bore flanged rubber DN250 to DN2400	✓	✓	✓
	Virtual full bore flanged polypropylene DN40 to DN200	✓	✓	✓
	Reduced bore flanged rubber DN40 to DN600	✓	✓	✓
	Probe 300 to 1000 mm	✓	✓	
Measurement	Class 2/0.5 % calibration	✓		
	Class 2/0.4 % calibration		✓	✓
	Class 1 calibration		✓	✓
	Class 2/0.2 % calibration		✓	✓
	Extended range class 1 and 2 calibration		✓	✓
	Totalizer	✓	✓	✓
	Pressure		✓	✓
	Internal logger		✓	✓
Power	AC (100 to 230 V, 50 or 60 Hz)		✓	✓
	Battery	✓	✓	✓
	Renewable (solar/wind)		✓	✓
Outputs	Digital outputs	✓	✓	✓
	Modbus		✓	✓
	Sensus compatible	✓	✓	
	Mobile communications			✓
Special application needs	Sensor submerged (up to 10 m) or buried (up to 5 m) *	✓	✓	✓
	Retrofit with legacy AquaMaster sensors		✓	✓

*DN40 to 600 reduced bore, DN40 to 200 virtual full bore sensors and DN450 to 2400 full bore sensors

Ordering information

Electromagnetic flowmeter

	1,2,3,4,5,6	7	8,9,10,11	12,13	14	15	16	17,18	19	20,21
Sensor and transmitter										
Standard integral flowmeter	FEW411									
Standard remote flowmeter	FEW412									
Advanced integral flowmeter	FEW431									
Advanced remote flowmeter	FEW432									
Premium integral flowmeter	FEW451									
Premium remote flowmeter	FEW452									
Sensor only										
Standard remote sensor	FEW418									
Advanced remote sensor	FEW438									
Premium remote sensor	FEW458									
Sensor style/liner material										
Full bore/rubber liner		F								
Virtual full bore/polypropylene liner		V								
Reduced bore/rubber liner		R								
Probe/PEEK		A								
Meter size										
DN40 (1½ in)			0040							
DN50 (2 in)			0050							
DN65 (2½ in)			0065							
DN80 (3 in)			0080							
DN100 (4 in)			0100							
DN125 (5 in)			0125							
DN150 (6 in)			0150							
DN200 (8 in)			0200							
DN250 (10 in)			0250							
DN300 (12 in)			0300							
300 mm (12 in) insertion probe length			P030							
DN350 (14 in)			0350							
DN400 (16 in)			0400							
DN450 (18 in)			0450							
DN500 (20 in)			0500							
500 mm (20 in) insertion probe length			P050							
DN600 (24 in)			0600							
DN700 (28 in)			0700							
700 mm (28 in) insertion probe length			P070							
DN750 (30 in)			0750							
DN800 (32 in)			0800							
DN900 (36 in)			0900							
DN1000 (40 in)			1000							
1000 mm (40 in) insertion probe length			P100							
DN1050 (42 in)			1050							
DN1100(44 in)			1100							
DN1200 (48 in)			1200							
DN1350 (54 in)			1350							
DN1400 (56 in)			1400							
DN1500 (60 in)			1500							
DN1600 (64 in)			1600							
DN1650 (66 in)			1650							
DN1800 (72 in)			1800							
DN1950 (78 in)			1950							
DN2000 (80 in)			2000							
DN2100 (84 in)			2100							
DN2200 (88 in)			2200							
DN2400 (96 in)			2400							
Others			9999							

Continued on next page ...

...Ordering information

...Electromagnetic flowmeter

	1,2,3,4,5,6	7	8,9,10,11	12,13	14	15	16	17,18	19	20,21
	See page 53									
Process connection type										
ANSI/ASME B16.5/16.47 series B Class 150 – DN40 to 600 (1½ to 24 in)				A1						
ANSI/ASME B16.5/16.47 series B Class 300 – DN40 to 600 (1½ to 24 in)				A3						
AWWA C207 Class B – DN700 to 2400 (28 to 96 in)				C1						
AWWA C207 Class D – DN700 to 2400 (28 to 96 in)				C2						
AWWA C207 Class E – DN700 to 2400 (28 to 96 in)				C3						
AS 4087 PN 16 – DN40 to 2400 (1½ to 96 in)				E1						
AS 2129 Table E – DN40 to 2400 (1½ to 96 in)				E4						
JIS 7.5K – DN40 to 2400 (1½ to 96 in)				J0						
JIS 10K – DN40 to 2400 (1½ to 96 in)				J1						
JIS 5K – DN40 to 2400 (1½ to 96 in)				J2						
1 in BSP coupling (¾ in pressure tap) – probe only				N1						
1½ in BSP coupling (¾ in pressure tap) – probe only				N2						
1 in NPT coupling (¾ in pressure tap) – probe only				N3						
ISO 7005, DIN, EN 1092 – 1 PN 10 – DN40 to 2400 (1½ to 96 in)				S1						
ISO 7005, DIN, EN 1092 – 1 PN 16 – DN40 to 2400 (1½ to 96 in)				S2						
ISO 7005, DIN, EN 1092 – 1 PN 25 – DN40 to 2400 (1½ to 96 in)				S3						
ISO 7005, DIN, EN 1092 – 1 PN 40 – DN40 to 2400 (1½ to 96 in)				S4						
Others				Z9						
Process connection material										
Carbon steel					B					
Stainless steel carrier (probe only)					J					
Brass seal carrier (probe only)					K					
Without (probe only)					U					
Measuring electrodes material										
Stainless steel 316L (1.4404)						R				
Super austenitic steel (1.4529)						U				
Other						Z				
Grounding accessories										
Without							A			
2 grounding rings (standard)							E			
Protection class – transmitter/sensor										
IP68, NEMA 6P/IP68, NEMA 6P – integral, remote cable not fitted and not potted (IP68 only after potting by others)								80		
IP68, NEMA 6P/IP68, NEMA 6P – remote mount cable fitted and potted								81		
Power supply										
Battery powered – battery not fitted									B	
Battery powered – battery fitted									L	
AC + internal back-up									K	
AC + external back-up – battery not fitted									H	
AC + external back-up – battery fitted									J	
External renewable energy + internal back-up									R	
External renewable energy + internal + external back-up – battery not fitted									M	
External renewable energy + internal + external back-up – battery fitted									N	
Outputs										
Modbus + pulse output *										M4
Pulse output										B1
Sensus communication protocol compatible + pulse output *										S1
4G										C1
4G + pulse output										C2
4G + Modbus + pulse output										C4
nB-IoT										J1
nB-IoT + pulse output										J2
nB-IoT Modbus + pulse output										J4
Without (FEW411, FEW412 and sensor only)										Y0

* With 3KXF221400L0XXX FEW4 sensor cable – see **Accessories** on page 60.

Options – add to order code as required	
Logger and protocol	
Internal logger option	LPN
Internal Logger with MQTT + Sparkplug B	LPQ
Calibration type (3 test points as standard)	
Class 2.5 calibration – FEW411 and FEW412 only	RCS
Class 2/0.5 % factory calibration – FEW411 and FEW412 only	RCC
Class 2/0.4 % factory calibration – standard with FEW43X and FEW45X only	RCD ¹
Class 2/0.2 % factory calibration – option with FEW43X and FEW45X only	RCB ²
Class 1 factory calibration – option with FEW43X and FEW45X only	RCF ²
Extended range Class 2 calibration – option with FEW43X and FEW45X only	RCM ³
Extended range Class 1 calibration – option with FEW43X and FEW45X only	RCN ³
2 % factory calibration (probe only)	RCW
Number of test points	
1	TV1
5	TV5
Signal cable length and type	
5 m (approx. 15 ft)	SC1
10 m (approx. 30 ft)	SC2
20 m (approx. 66 ft)	SC4
30 m (approx. 98 ft)	SC6
50 m (approx. 164 ft)	SCA
100 m (approx. 328 ft)	SCE
150 m (approx. 492 ft)	SCG
Additional cables	
Sensus cable, 5 m	SR1
Sensus cable, 20 m	SR4
Renewable energy cable, 10 m	SP2
Accessories	
1½ in ball valve	AB
RS485 lead with MIL connector for Modbus	AT
NFC to Wall mount Coupler 5 m cable	AJ
NFC to Wall mount Coupler, 10 m cable	AK
NFC to USB, 10 m cable	AL
NFC to USB, 20 m cable	AM
Display protective cover	
Display protective cover without NFC	AD1
Display protective cover with NFC, 5 m cable	AD2
Display protective cover with NFC, 20 m cable	AD3
Mobile Communication Accessories	
Remote antenna 5 m	G7
Remote antenna 10 m	G8
Mobile Communication Territory	
USA, Canada & Mexico	GTA
China	GTC
Australia, Argentina, Columbia, Chile, Brazil, Bolivia Peru & Panama*	GTD
Rest of the world	GTZ
Pressure span	
2000 kPa/20 bar/300 psi	PS3
4000 kPa/40 bar/580 psi	PS4
Pressure transducer	
Remote, cable length 10 m (33 ft)	PT5
Remote, cable length 20 m (65 ft)	PT6
Other usage certifications⁵	
Measuring Instruments Directive (MID)	CM1
OIML R49	CM2
NMI M10/R49	CM3 ⁴
UL Fire Service approval	CMF
PAC	CMP

¹ Calibration option RCD will have a reduced R (Q3/Q1) value without verification and are dependent on optional selection " Other Usage certification - CM2/CM3", refer to table 12 & 13

² Calibration option RCB/RCF will have a reduced R (Q3/Q1) value with verification and are dependent on optional selection " Other Usage certification - CM1/CM2/CM3", refer to table 12 & 13

³ Calibration options RCM/RCN will have a extended R (Q3/Q1) value with verification and are dependent on optional selection "Other Usage certification - CM1/CM2/CM3", refer to page 22 & 26

⁴ Calibration option RCS will have R (Q3/Q1) value without verification and are dependent on optional selection " Other Usage Certification - CM3" refer to page 22 & 26.

⁵ If no selection made, standard factory calibration/verification.

*Contact ABB Sales/Support for any Latin American countries not specified above

...Ordering information

...Electromagnetic flowmeter

Potable water approvals	
WRAS - cold water approval*	CWA
NSF-61#	CWC
AZ/NZS 4020*	CWE
ACS#	CWF
WRAS - 60 °C water approval*	CWK
WRAS - 50 °C water approval*	CWN
Without	CWY
Other options	
With customer property label	KL
Documentation language	
German	M1
Spanish	M3
French	M4
English	M5
Chinese	M6
Polish	M9
Italian	M2
Portuguese	MA
Turkish	MT
Transmitter Software Function Package	
Backward-compatible to legacy AquaMaster Sensors (for FET452 only)	NFL

* Material approval
#Meter Approval

Transmitter

	Product coding field number	1,2,3,4,5,6	7	8,9
Transmitter only				
Standard remote transmitter	FET412			
Advanced remote transmitter	FET432			
Premium remote transmitter	FET452			
Power supply				
Battery powered – battery not fitted			B	
Battery powered – battery fitted			L	
AC + internal back-up			K	
AC + external back-up – battery not fitted			H	
AC + external back-up – battery fitted			J	
External renewable energy + internal back-up			R	
External renewable energy + internal + external back-up – battery not fitted			M	
External renewable energy + internal + external back-up – battery fitted			N	
Outputs				
Modbus				M4
Pulse output				B1
Sensus communication protocol compatible				S1
4G				C1
4G + pulse output				C2
4G + Modbus + pulse output				C4
nB-IoT				J1
nB-IoT + pulse output				J2
nB-IoT + Modbus output + pulse output				J4
Without (FEW411 and FEW412 only)				Y0
Options – add to order code as required				
Logger and protocol				
Internal logger option				LPN
Internal Logger with MQTT + Sparkplug B				LPQ
Additional cables				
Sensus cable, 5 m				SR1
Sensus cable, 20 m				SR4
Renewable energy cable, 10 m				SP2
Accessories				
RS485 lead with MIL connector for Modbus				AT
NFC to Wall mount Coupler, 5 m cable				AJ
NFC to Wall mount Coupler, 10 m cable				AK
NFC to USB, 10 m cable				AL
NFC to USB, 20 m cable				AM
Display protective cover				
Display protective cover without NFC				AD1
Display protective cover with NFC, 5 m cable				AD2
Display protective cover with NFC, 20 m cable				AD3
Mobile Communication Accessories				
Remote antenna 5 m				G7
Remote antenna 10 m				G8
Mobile Communication Territory				
USA, Canada & Mexico				GTA
China				GTC
Australia, Argentina, Columbia, Chile, Brazil, Bolivia, Peru & Panama*				GTD
Rest of the world				GTZ
Pressure span				
2000 kPa/20 bar/300 psi				PS3
4000 kPa/40 bar/580 psi				PS4
Pressure transducer				
Remote, cable length 10 m (33 ft)				PT5
Remote, cable length 20 m (65 ft)				PT6
Other usage certifications				
OIML R49				CM2
NMI M10				CM3
Documentation language				
German				M1
Spanish				M3
French				M4
English				M5
Chinese				M6
Polish				M9
Italian				M2
Portuguese				MA
Turkish				MT
Transmitter Software Function Package				
Backward-compatible to legacy AquaMaster Sensors (for FET452 only)				NFL

...Ordering information

...Transmitter

Probe bore gauge tool

	1,2,3,4	5	6,7,8,9
Probe bore gauge tool	APBGT		
Housing			
R1 housing		2	
Bore size			
700 mm			700
760 mm			760
800 mm			800
900 mm			900
1000 mm			1000
1100 mm			1100
1200 mm			1200
1400 mm			1400
1500 mm			1500
1600 mm			1600
1800 mm			1800
2000 mm			2000
2200 mm			2200

Transmitter electronics only

	1,2,3,4, 5, 6	7	8,9
Standard integral transmitter generic	F E T 4 1 9		
Standard remote transmitter generic	F E T 4 1 0		
Advanced integral transmitter generic	F E T 4 3 9		
Advanced remote transmitter generic	F E T 4 3 0		
Power supply			
Battery powered – battery not fitted		B	
AC + internal back-up		K	
External renewable energy + internal back-up		R	
Outputs			
Modbus			M4
Pulse output			B1
Sensus communication protocol compatible			S1
Without			Y0

Additional codes to be added as required	MT
Logger and protocol	
Internal logger option	LPN
Pressure span	
2000 kPa/20 bar/300 psi	PS3
4000 kPa/40 bar/580 psi	PS4
Others	PSZ
Pressure transducer	
Remote, cable length 10 m (33 ft)	PT5
Remote, cable length 20 m (65 ft)	PT6
Documentation language	
German	M1
Spanish	M3
French	M4
English	M5
Chinese	M6
Polish	M9
Italian	M2
Portuguese	MA
Turkish	MT

Calibration/flow accuracy specification table

Calibration of the flowmeter to different calibration types and other usage certifications is done to meet the following values of R (Q3/Q1) for sizes DN40 to DN600.

Table 13 Calibration/verification of calibration values for "Other Usage Certification" MID (CM1)/OIML (CM2), Reduced Bore Sensor sizes DN40 - 600

DN	Reduced bore sensor			
	Mains powered		Battery/renewable energy powered	
	Class 2	Class 1	Class 2	Class 1
40	250	200	160	100
50	250	200	160	100
65	250	200	160	100
80	250	200	160	100
100	250	200	160	100
125	250	200	160	100
150	250	200	160	100
200	250	200	160	100
250	250	200	160	100
300	250	200	160	100
350	250	200	63	63
400	160	200	63	63
450	160	200	63	63
500	160	200	63	40
600	160	200	63	40

Table 14 Calibration/verification of calibration values for "Other Usage Certification" MID (CM1)/OIML (CM2), Full Bore Sensor sizes DN40 - 600

DN	Full bore sensor			
	Mains powered		Battery/renewable energy powered	
	Class 2	Class 1	Class 2	Class 1
40	200	125	80	63
50	200	125	80	63
65	200	125	80	63
80	200	125	80	63
100	200	125	80	63
125	200	125	80	63
150	200	125	80	63
200	200	125	80	63
250	200	125	80	63
300	200	125	80	63
350	80	80	80	63
400	80	80	80	63
450	80	80	80	63
500	80	80	80	63
600	80	80	80	63
700	80	80	40	40
750	80	80	40	40
800	80	80	40	40
900	63	40	40	-
1000	63	40	40	-
1050	63	40	40	-
1100	63	-	40	-
1200	63	-	40	-

Accessories

Ordering code	Description
3KXF208400L0100	AM4 battery pack 10 lithium D cells
3KXF208400L0200	AM4 battery pack 50 lithium D cells
3KXF208400L0300	AM4 display protective cover
3KXF208400L0400	AM4 display protective cover NFC 5 m cable
3KXF208400L0500	AM4 display cover NFC 20 m Cable
3KXF208400L0600	AM4 RS485 lead Mil connectors Modbus
3KXF221400L0100	FEW4 sensor/pulse/Modbus cable 5 m (15 ft approx.)
3KXF221400L0200	FEW4 sensor/pulse/Modbus cable 10 m (30 ft approx.)
3KXF221400L0300	FEW4 sensor/pulse/Modbus cable 20 m (66 ft approx.)
3KXF221400L0400	FEW4 sensor/pulse/Modbus cable 30 m (98 ft approx.)
3KXF221400L0500	FEW4 sensor/pulse/Modbus cable 50 m (164 ft approx.)
3KXF221400L0600	FEW4 sensor cable 100 m junction box/Mil
3KXF221400L0700	FEW4 sensor cable 150 m junction box/Mil
3KXF221400L0800	FEW4 sensor cable 500 m
3KXF221400L0900	FEW4 junction box and cable – M20 to Mil
3KXF208400L0700	AM4 Sensus cable 5 m (15 ft approx.)
3KXF208400L0800	AM4 Sensus cable 20 m (66 ft approx.)
3KXF208400L0900	AM4 renewable energy cable 10 m
3KXF208400L1000	AM4 pulse output cable 1 m
3KXF208400L2100	AM4 pressure transducer 20 bar 10 m
3KXF208400L2200	AM4 pressure transducer 20 bar 20 m
3KXF208400L2500	AM4 pressure transducer 40 bar 10 m
3KXF208400L2600	AM4 pressure transducer 40 bar 20 m
3KXF221400L1100	FEW4 terminal box potting compound 200 g
3KXF221400L1200	FEW4 ball valve stainless steel 1½ in BSP
3KXF221400L1300	FEW4 bush stainless steel 1½ in M x 1 in BSP
3KXF221400L1400	FEW4 ball valve stainless steel 1½ in NPT
3KXF221400L1500	FEW4 bush stainless steel 1½ in M x 1 in NPT
3KXF221400L1600	FEW4 AquaProbe seal replacement kit
3KXF208400L2700	AM4 transmitter seal kit
3KXF208400L2800	AM4 battery connector kit
3KXF221400L1700	FEW4 preamp board and potting kit
3KXF208400L2900	AquaMaster 4 – demonstration kit (FEX41X/FEX43X)
3KXF221400L1800	FEW4 terminal box maintenance kit
3KXF208400L3000	AM4 antitamper security kit
3KXF208400L3100	AM4 remote transmitter mounting bracket kit
3KXF221400L1900	FEW4 earth strap kit
3KXF208400L3700	External battery PSU with batteries not fitted for Tx (FET450)
3KXF208400L3800	External battery PSU with batteries fitted for Tx (FET450)
3KXF208400L3900	AC PSU with D-cell batteries not fitted for Tx (FET450)
3KXF208400L4000	AC PSU with D-cell batteries fitted for Tx (FET450)
3KXF208400L4100	Renewable PSU with D-cell batteries not fitted for Tx (FET450)
3KXF208400L4200	Renewable PSU with D-cell batteries fitted for Tx (FET450)
3KXF208400L5200	NFC to USB, 10 m cable for FEX450
3KXF208400L5300	NFC to USB, 20 m cable for FEX450

Ordering code	Description
3KXF208400L4400	NFC to wall mount coupler, 5 m (FEX450)
3KXF208400L4500	NFC to wall mount coupler, 20 m (FEX450)
3KXF208400L4600	Battery holder sub-assembly for AC/Ren operated Tx (FET450)
3KXF208400L4700	Battery holder subassembly for battery operated Tx (FET450)
3KXF208400L4800	Demo kit for AM4 Mobile Comms with NB-IOT for China
3KXF208400L4900	Demo kit for AM4 Mobile Comms with 4G for Europe and Asia
3KXF208400L5000	Demo kit for AM4 Mobile Comms with 4G for North America
3KXF208400L5100	Demo kit for AM4 Mobile Comms with 4G for Australia
3KXF208400L5600	FET450 PSU Mounting Bracket

Acknowledgements

- Android is a trademark of Google LLC.
- Google Play is a trademark of Google LLC.
- Modbus is a registered trademark of Schneider Electric USA, Inc.
- Sensus is a registered trademark of Sensus USA, Inc.
- Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries.

Notes

Sales



Service



Software



Notes

ABB Measurement & Analytics

For your local ABB contact, visit:
www.abb.com/contacts

For more product information, visit:
www.abb.com/measurement

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CARACTERÍSTICAS Y DIMENSIONES

Materia prima:

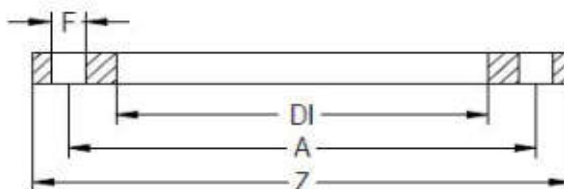
Acero Zincado

Uso:

Antiincendio - Gas - Industrial - Agua potable

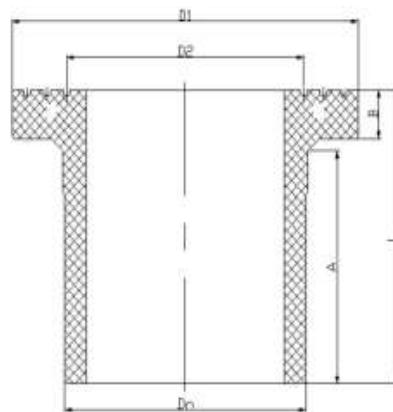
Normas/especificaciones:

DIN2576, DIN2577, UNI-EN1092



Código	DE	DN	PN	A (mm)	Z (mm)	DI (mm)	F (mm)	Tornillo Métrico	Nº Agujeros
0508050016	50	40	10/16	110	150	62	18	M16	4
0508063016	63	50	10/16	125	165	78	18	M16	4
0508075016	75	65	10/16	145	185	92	18	M16	4
0508090016	90	80	10/16	160	200	108	18	M16	8
0508110016	110	100	10/16	180	220	128	18	M16	8
0508125016	125	100	10/16	180	220	135	18	M16	8
0508125116	125	125	10/16	210	250	135	18	M16	8
0508140016	140	125	10/16	210	250	158	18	M16	8
0508160016	160	150	10/16	240	285	178	22	M20	8
0508180016	180	150	10/16	240	285	188	22	M20	8
0508200010	200	200	10	295	340	235	22	M20	8
0508250010	250	250	10	350	395	288	22	M20	12
0508280010	280	250	10	350	395	294	22	M20	12
0508315010	315	300	10	400	445	338	22	M20	12
0508355010	355	350	10	460	505	376	22	M20	16
0508400010	400	400	10	515	565	430	26	M24	16
0508450010	450	500	10	620	670	517	26	M24	20
0508500010	500	500	10	620	670	533	26	M24	20
0508560010	560	600	10	725	780	645	30	M27	20
0508630010	630	600	10	725	780	645	30	M27	20
0508200016	200	200	16	295	340	235	22	M20	12
0508250016	250	250	16	355	405	288	26	M24	12
0508280016	280	250	16	355	405	294	26	M24	12
0508315016	315	310	16	410	460	338	26	M24	12
0508355016	355	350	16	470	520	376	26	M24	16
0508400016	400	400	16	525	580	430	30	M27	16
0508450016	450	500	16	650	715	517	33	M30	20
0508500016	500	500	16	650	715	533	33	M30	20
0508630016	630	600	16	770	840	645	36	M33	20

ACQUA-SOLFIT, S.L. se reserva el derecho de revisar esta especificación, manteniendo el cumplimiento de los requisitos del producto sin previo aviso. Tolerancia en diámetros y espesor de acuerdo con las normas a menos que se especifique lo contrario. Tolerancia: $\pm 5\%$



Dn /MM	KG		MM				
	SDR11	SDR17	A	B	L	D1	D2
40	0,050	/	69	13	82	76	31
50	0,100	/	67	13	82	85	40
63	0,200	/	82	15	98	102	51
75	0,250	/	87	15	104	121	60
90	0,450	0,300	93	20,7	119	136,7	109,5
110	0,650	0,550	104	19,2	126	160	130
125	0,700	0,600	96	22	123	160	125
140	0,950	0,750	98	21	124	160	107
160	1,500	1,300	110	21	143	210	165
180	1,950	1,500	118	26	151	215	145
200	2,400	2,200	127,6	26	163	265,4	215
225	2,900	2,600	116	35	159	273	180
250	4,100	2,850	157	30	198	315,5	256
280	4,900	3,200	149	34	191	320	250
315	6,550	4,650	170	33	209	372,4	306,4
355	9,350	6,350	183	36	232	430	340,5

PE100, SDR11: 10 bar para gas, 16 bar para agua

PE100, SDR17: 5 bar para gas, 10 bar para agua

ISO4437-3 / EN1555-3 / ISO4427-3 / EN12201-3 / ISO15494, AS/NZS 4129

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Justificant de presentació

Dades del contracte

Denominació del contracte	Subministrament dels cabalímetres digitals pels dipòsits per l'empresa municipal Serveis Municipals Sant Quirze SLU. – SQVaigua.
Òrgan de contractació	Serveis Municipals Sant Quirze, SL
Codi d'expedient	51/2025/SMSQV/CO
Procediment d'adjudicació	Obert simplificat abreujat
Termini de presentació d'ofertes	16/07/2025 14:00:00

Dades de l'empresa licitadora

Presentada com a UTE	No
Nom de l'empresa	3G AGUAS S.L.
Identificador de l'empresa	B60917143
Tipus de l'empresa	PIME
País de l'empresa	Espanya

Dades de la sol·licitud

Títol	Sol·licitud d'aclariment
Descripció	A la vista de la documentació aportada, s'ha acordat que la vostra empresa ha de presentar un aclariment. Cal que aporteu la informació complementària corresponent abans de la data i hora de fi de termini: Atorgar a 3G AGUAS S.L, amb NIF núm. B60917143, un termini de 3 dies hàbils des de l'enviament de la corresponent comunicació perquè, d'acord amb el plec de clàusules administratives i particulars que regeixen aquest contracte, perquè aclareixi si els cabalímetres i els seu equipament tècnic poden transmetre les dades pel sistema LoRaWAN, protocol de comunicació obert dissenyat per a xarxes d'àrea ampla de llarg abast, que permet a dispositius IoT interconnectar-se sense fils amb baix consum d'energia.
Número de registre d'entrada	E2025000260
Data/hora de presentació	22/07/2025 11:43:00

Documentació

Títol	Nom fitxer / Empremta electrònica	Mida	Obligatori	Confidencial
Presentació aclariment.	DS_FET400-EN_G (1).pdf 1e393b35ed357c8a0752f111012593898dd3050f14b5dcc1c240417cd1c37f54	10 MB	Sí	No
Presentació aclariment.	ok EXP. 51-2025-SMSQV-CO.pdf d40909eba664e1528be29ff4d94216a63116888bd40c5a4762eff59582d192f3	155 KB	Sí	No
Presentació aclariment.	Up-to-10km Smart Water - IoTThinks.com.pdf 2243e52b512799e5f1afb6642f404113d2d7b9807f0bb7d2393eb6e59aa850e9	737 KB	Sí	No

ABB MEASUREMENT & ANALYTICS | DATA SHEET | DS/FET400-EN REV. G

AquaMaster4 FEW4 and FET4

Electromagnetic flowmeter



Measurement made easy

The ideal flowmeter for potable water distribution networks, revenue metering and irrigation applications

Multiple measurement parameters

- flow rate, flow velocity, volume flow (forward, reverse and net) and pressure (option)

Integrated mobile communications

- NB-IoT (LTE Cat NB1 for China) & 4G LTE Cat1 with fall back to 3G

Multiple power options

- battery (with up to 10 years' life), renewable and AC mains

Wide range of sensor styles and size

- reduced bore DN40 to 600, virtual full bore DN40 to 200, full bore DN250 to 2400 and probe 300 to 1000 mm

Ideal for arduous applications

- IP68 for submersion up to 10 m that are prone to flooding and up to 5 m buriable

Verification

- in-situ diagnostics and self-checking capabilities to OIML type P

Flexible communications

- pulse, Modbus™ and Sensus™ with NFC interface to mobile smartphone/tablet

Diverse data options for mobile communications

- CSV/JSON files exchange through explicit FTPS/FTP (TLS1.2-based encryption) or MQTTS/MQTT Sparkplug B for 4G/3G and data exchange through LwM2m (over CoAP with DTLS 1.2 encryption) for NB-IoT (China Telecom IoT Platform)

Product is certified to NSF/ANSI/CAN 61-G, OIML R49:2013 & MID

Applications

- Water supply in district/zonal metering area
- Revenue metering
- Leak monitoring in district/zonal metering area
- Survey and flow investigation
- Irrigation and abstraction
- Fire suppression systems

Additional product features

- In-situ diagnostics and optional self-checking capabilities with OIML R49 type P (Approval pending for FEX45X)
- High and low flowrate alarms
- Backward compatible with legacy AquaMaster sensors
- Drinking water certifications: WRAS, NSF-61, ACS, AS/NZS 4020
- Certificates: OIML R49:2013, MID MI-001, NMI 10, PAC and UL 327 B
- Wireless certification: CE-RED, FCC/IC, PTCRB, SRRC

Values to you

- Solution from the masters of flow measurement – in 1988, ABB invented and designed the world's first battery-powered electromagnetic flowmeter for DMA (District Metered Area)
- Invest smartly through 'single box' DMA solution – combining measurement (flow & pressure), data logging and mobile communications
- Have greatest confidence in your billing based on highest accuracy with widest flow range revenue meter
- Get early warnings for leaks or bursts and reduce NRW (Non-Revenue Water) – highest confidence in night line performance
- Have highest confidence in the wet calibration – our flow rigs are certified by various national independent accredited bodies/laboratories all linked by the 'International Laboratory Accreditation Cooperation' (ILAC)
- Frequent granular data of process (flow rates and totalizer) and diagnostic parameters help to reduce operational cost or eliminate energy wastage and will enable you to control your supply and demand more accurately
- Get data at a higher resolution for precise and specific periods of interest anytime and every time
- Cyber Security assurance for data confidentiality and integrity including changes made in configuration settings or firmware upgrades with complete traceability which could be requested over air in near real time
- Fit-and-flow with factory default settings. Use the ABB Velox Interface mobile smartphone/tablet app to easily change configuration/settings to your preference
- Lowest total cost of ownership (TOTEX) over complete product lifecycle
- Maximum confidence in the health of the flowmeter through the use of ABB's SRV500 in-situ verification tool

Overview

FEX41X/FEX43X

Multiple power options



2 x internal batteries
(up to 10 years life)



Solar



Wind



AC mains

Interactive phone/tablet app – simple and easy



Secured and easy



Contactless



Chart and retrieve data



Offline configuration

Google Play™
Easy firmware update

Configurable features



In-built logger



Pressure measurement



Self-checking



Communications options



Pulse output



Modbus



Sensus protocol

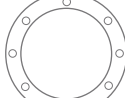
Multiple sensor options



Reduced bore
DN40 to 600



Virtual full bore
DN40 to 200



Full bore
DN250 to 2400



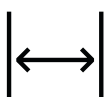
Probe
300 to 1000 mm



Measurement performance



Accuracy
up to $\pm 0.2\%$
 ± 0.5 mm/s
whichever is greater



Range (R)
up to R1000

Drinking water approvals

NSF-61 | WRAS | AS/NZS 4020 |
DVGW | ACS | D.M. 174

Wide environmental conditions



IP68 to 10 m
and up to 5 m
variable



-20 to 60 °C

Comparable to DIN ISO 12944
Corrosion resistance

Product type approvals

OIML R49:2013 for accuracy class 1
and 2 | MID MI-001 | NMI 10 | PAC

Calibration rig approvals

ISO 17025 | UKAS | NATA | SIMT
| NIST traceable | NABL

FEX45X**Multiple power options**

6 x internal
batteries
(up to 8
years life)



Solar



Wind



AC mains

Interactive phone/tablet app – simple and easy

Secured and
easy



Contactless



Chart and
retrieve data



Offline
configuration

**Google
Play**
Easy
firmware
update

Configurable features

In-built
logger



Pressure
measurement



Self-checking

Communications options

Pulse output



Modbus



4G/
nB - IoT

Data options

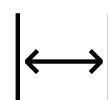
FTPS/MQTTs
with
Sparkplug B



CSV/JSON

Measurement performance

Accuracy
up to $\pm 0.2\%$
 $\pm 0.5\text{ mm/s}$
whichever
is greater



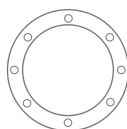
Range (R)
up to R1000

Multiple sensor options

Reduced
bore
DN40 to
600



Virtual full
bore
DN40 to
200



Full
bore
DN250
to 2400



Probe
300 to
1000 mm

**Drinking water approvals**

NSF-61 | WRAS | AS/NZS 4020 |
DVGW | ACS | D.M. 174

Wide environmental conditions

IP68 to IP10
and up to 5 m
buriable



-20 to $60\text{ }^{\circ}\text{C}$

**Comparable
to
DIN
ISO 12944**
Corrosion
resistance

Product type approvals

OIML R49:2013 for accuracy class 1
and 2 | MID MI-001 | NMI 10 | PAC

...Overview

Why is AquaMaster4 your first choice for distribution networks and revenue metering applications?

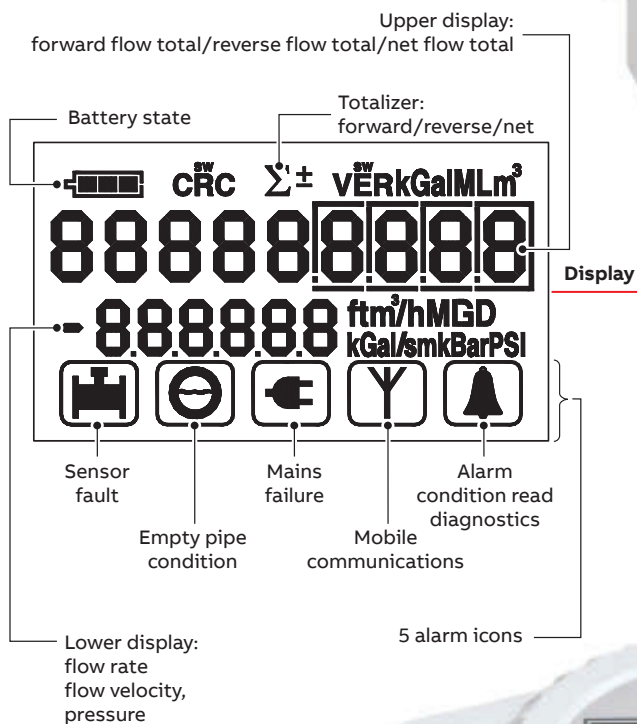
Your challenge	Our offering	Advantages for you
Do you have confidence in your revenue meter and therefore in your water balance table? 	AquaMaster4 offers highest accuracy with a wide flow range. Our OD upstream and downstream reduced bore sensor is virtually insensitive to hydraulic disturbances as it conditions the upstream fluid flow profile within the sensor's central measuring zone giving superior performance; especially during the night when the flow rate is low. The AquaMaster4's in-built optional cellular engine and data logger runs at high speed, logging at a fast rate giving the user total flexibility to download (typically 15 minutes) logged data; then investigate, in precise detail, flow and pressure activity during a period of interest at even higher time resolution. Such high resolution data facilitates step testing, leakage detection, water network analysis, reduces operational expenses and eliminates energy wastage. The in-built logger delivers accuracies which are not possible when using an external data logger.	Increase in revenue for authorized water consumption and early warnings on leaks (non-revenue water) 
Do you want to reduce the cost for commissioning and interacting with the product? 	A free app (Velox Interface) is available for use with Android™ smartphones and tablets. This supports simple configuration changes to made on your touchscreen color phone/tablet. Just touch to upload, then configure offline, touch again to update the AquaMaster4 configuration. The logger contents can be downloaded as a file in industry-standard CSV format in the same manner. To ensure the product remains up-to-date with the latest features and enhancements, the firmware is updated using the Velox Interface app. 'Fit-and-Flow' data storage inside AquaMaster4 eliminates the need to match a remote sensor with a transmitter in the field. On initial installation, the self-configuration sequence replicates all calibration factors, meter size and serial numbers, together with customer site-specific settings, into the transmitter automatically, eliminating the opportunity for error.	Increase productivity of your staff/contractor and eliminate poor quality through human error 
Do you want to have the lowest operational expenditure throughout the lifecycle of the product? 	Using standard off-the-shelf 'D' lithium cells, the AquaMaster4 can be operated for up to 10 years. Using a simple DC (6 to 32 V) connection from sources as small as a 5 W solar panel/wind generator, AquaMaster4 can be operated with green energy sources. There is no longer any need for bespoke cables and laptops to connect to each transmitter. In-situ self checking of flowmeter health enables the user to meet regulatory/technical requirements. In 1995, ABB invented and designed the world's first in-situ verification system for electromagnetic flowmeters. Building on ABB's fingerprint philosophy, each flowmeter is verification tested before shipping from the factory. SRV500 enables the operator to choose whether to either use the factory fingerprint or, after product commissioning, to create a new fingerprint based on real site conditions.	Lower cost of ownership  Simplifies compliance to ISO 9001 traceability without any additional effort 

FEX41X / FEX43X**Protective cover with wire to the contactless coupler**

The removable cover protects the transmitter display from accidental impact damage

**Wall mount contactless coupler**

The wall mount coupler allows users to communicate easily using a mobile phone/tablet when the transmitter is located in inaccessible places (for example, a pit)

**Contactless communication**

Interacting with the transmitter is easily achieved with an Android smartphone/tablet over NFC

**IP68 connectors**

IP68 rated as standard, the transmitter can be fully submerged for up to 2 meters

Anti-tamper seal

Secured against any tampering, meeting MID MI-001 regulations

Power supply enclosure

Enclosure for battery, AC or renewable power options

...Overview

FEX45X



NFC Cover with wire to the contactless coupler/USB

The removable cover enables contactless communication with USB termination or extension to wall mount contactless coupler



Wall mount contactless coupler

The wall mount coupler allows users to communicate easily using a mobile phone/tablet when the transmitter is located in inaccessible places (for example, a pit)

In-built data logger (optional)

Optional multi-speed, flowrate and pressure internal logger runs at high speed, allowing user to request logged data at any interval (typically set to one minute, but can be as fast as 15 seconds)

Contactless communication

AquaMaster4 is the first instrument to feature a contactless interface using industry standard Near Field Communication (NFC). A free App (Velox) available for use with Android and Windows smartphones and tablets supports simple configuration changes to be made on your touchscreen color phone/tablet.



Wireless communication

In-built cellular engine (4G/nB- IoT) sends logged data of measurement along with changes in configuration settings either as summary report or in reply to ad hoc requests with alarm notification for diagnostics

Fit and flow

No need to match sensor and transmitter, as the sensor stores all calibration factors, site settings and serial numbers

Power options

Plug-in external power supply unit (PSU) with option to select Battery/AC Main/Solar or Wind which is a 3.6 V DC interface only. Integral flowmeters are powered with internal batteries.

IP68 connectors

IP68 rated as standard, the transmitter can be fully submerged for up to 2 meters

Range of flange options

ISO 7005, DIN, EN 1092-1 PN10/PN16 / PN25/PN40
 ANSI/ASME B16.5/16.47 series B
 Class 150/Class 300
 AWWA C207 Class B/D/E
 AS 4087 PN16
 AS2129 Table E
 JIS 7.5K/10K/5K

EN ISO 12944 C4 grade comparable corrosion resistance

Zinc-based primed with $\approx 70 \mu\text{m}$ (optional $300 \mu\text{m}$) thick paint coat will give long lasting corrosion resistance even in arduous applications

IP68, NEMA 6P

All sensor types are, as standard, inherently submersible thus ensuring suitability for installation in chambers and metering pits that are prone to flooding

Sensor memory

The sensor stores all calibration factors, site settings and serial numbers enabling users to fit-and-flow

Drinking water approvals

NSF-61 | WRAS | AS/NZS 4020 | DVGW | ACS | D.M. 174

Upstream and downstream pipe length

Reduced bore DN40 to 600 requires 0D upstream and downstream
 Virtual full bore DN40 to 200 requires 5D upstream and 0D downstream (0D upstream and 0D downstream to OIML R49:2013 only)
 Full bore DN250 to 2400 requires 5D upstream and 2D downstream (3D upstream and 0D downstream to OIML R49:2013 only)

Available in both integral and remote form

IP68, NEMA 6P

All sensor types are, as standard, inherently submersible thus ensuring suitability for installation in chambers and metering pits that are prone to flooding

Sensor memory

The sensor stores all calibration factors, site settings and serial numbers enabling users to fit-and-flow

Material selected to last

The sensor body material enables it to be used in rugged applications

Hot tap capability

The sensor construction enables installation with no interruption to water supply

Drinking water approvals

NSF-61 | WRAS | ACS

Calibration in ABB flow laboratory



Figure 1 ABB calibration rig – certificated by ISO, UKAS, NATA, SIMT and NIST traceable

ABB's flow calibration facilities are certified by various national independent accredited bodies/laboratories and these are all linked by the 'International Laboratory Accreditation Cooperation' (ILAC7).

Flowmeters in ABB's facilities can be calibrated by one of the following methods:

- gravimetric (using weigh scales)
- volumetric (using the meter prover)
- comparison (using reference meters)

Additionally, ABB's laboratories are checked against each other and against external accredited laboratories using transfer standard meters.

Gravimetric

In this method, the flowmeter is calibrated in a pipeline, with water being pumped through it from a sump. A diverter valve situated downstream directs the flow from the meter either back to the sump or to a tank of sufficient capacity attached to a highly accurate weighing system.

Volumetric

There are two main methods of volumetric calibration:

- Fixed volume volumetric tank method
 - This method works in a similar way to the gravimetric method, except that the flow from the meter is diverted into a tank of known volumetric capacity. This eliminates the need for a weighing system or to calculate the volume of water from its weight.

- Fixed volume ball meter prover

- In this method, the diverter valve directs the flow from the meter into a meter prover. The prover is a precisely manufactured section of pipe containing a sphere that is three percent larger in diameter than the pipe. Two detector switches are situated in the pipe at a fixed distance apart. The volume of water that is contained in the pipe between the switches is known as the calibrated volume.

–

Comparison

In this method, the flowmeter under calibration is installed in a pipeline in series with a reference, or master, flowmeter with a known calibration. Once the flow of water through both meters is stable, a timer is started and the outputs of both meters are simultaneously monitored. After a set period, the timer is stopped. Using the data from the calibration run enables the average flowrate of the meter under test to be compared with the master meter, with the difference being the error.

Advantages of ABB's calibration rig

ABB has one of the largest calibration facilities in the world, capable of pumping 2.5 m³/s, enabling larger meters to be calibrated at high flowrates.

All of ABB calibration facilities are continuously pumped enabling a flowmeter to be calibrated at a steady flowrate (for example, over 300 or 600 seconds; or longer if required), to reduce a meter's random uncertainty errors during calibration.

ABB's high turndown flowmeters (those with a high R number) can be calibrated over an extended flow range, guaranteeing accurate flowmeter performance over its full operating range.

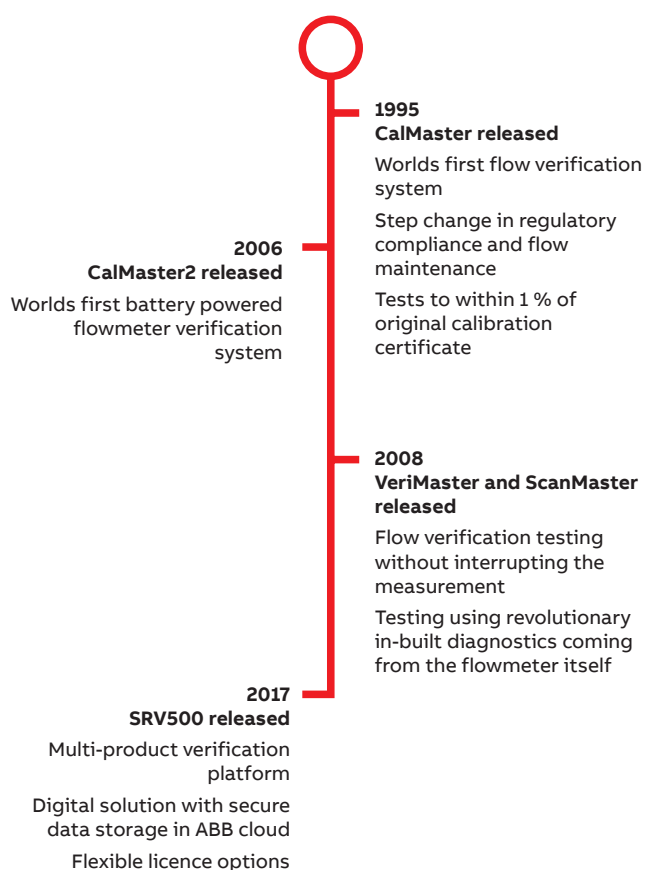
Verification

What is verification?

Verification is the inspection and testing of a product to establish that it meets regulatory/technical requirements. Industrial instrumentation is robust, very reliable and designed to operate for many years with minimal maintenance. In today's competitive environment customers are looking for ways to maximize their profitability, regular product verifications is one way to ensure processes continuously operate at their peak.

The ABB verification story

Customers in the water and process industries have been able to save large sums of money thanks to ABB's innovations in product verification over the last two decades.



Introducing SRV500

The next generation verification tool suite for use with ABB's complete range of active electronic flowmeters. Download the software for free and use the instrument-specific test routine to provide the best possible check of product health, without stopping your process.

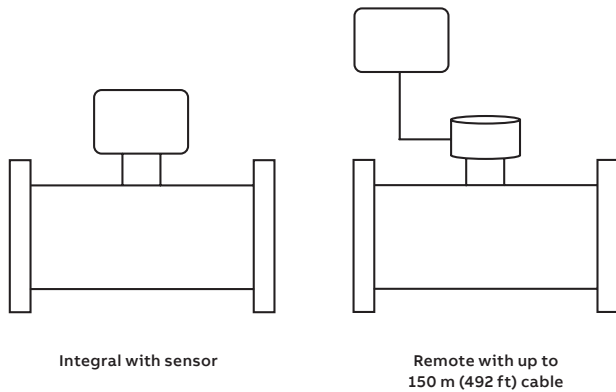
SRV500 verifies the condition and performance of the flowmeter under test. With the licensed software version, test reports can be generated and stored locally for further analysis. SRV500 also analyzes the product internal diagnostics and compares the results with historical measurements.

SRV500 enables the operator to choose whether to use either the factory fingerprint or to create a new fingerprint based on real site conditions after product commissioning. All verifications performed in the field can then be compared with the fingerprint data and previous tests to ensure flowmeter performance has not degraded.



Specification – transmitter (41X/43X)

Mounting on flow sensor



Power supply



Battery power

Only use 3.6 V lithium thionyl chloride D batteries recommended by ABB

Note. The following batteries work with the product:

- SAFT LS33600
- Eve ER34615
- GB Cell ER34615
- cT-energy ER34615
- OmniCel ER34615
- GEBC ER34615
- LiYa ER34615
- Fanzo ER34615H

The above batteries comply with the safety requirements of IEC60086-4, and have a maximum peak discharge current of less than 500mA.

Nominal battery life

Sensor style	Size	Integral mount transmitter	Remote mount transmitter
Reduced bore	DN40 to 80	10.5 years	8 years
	DN100 to 300	7 years	5.5 years
	DN350 to 600	6 years	5 years
Virtual full bore	DN40 to 200	10.5 years	8 years
Full bore	DN250 to 600	6 years	5 years
	DN700 to 2400	2.5 years	2 years
Probe	300 to 1000 mm	10.5 years	8 years

Test conditions:

- acquisition = 15 seconds
- pulse output = 2 Hz @ 5 ms
- alarm output on = 25 %
- logger rate = 1 minute
- with pressure
- integral verification self check = 15 minutes
- ambient temperature = 20 °C

Battery capacity and life are significantly shortened:

- when the operating environment temperature ranges between -20 and 0 °C or 50 and 70 °C (-4° and 32 °F or 122 and 158 °F)
- when data acquisition is less than 15 seconds
- when pulse output width > 5 ms and output frequency is set high
- with extended NFC interface use
- Class 2/Class 1 calibration to OIML R49 & MID options (CM2 & CM1 in ordering code)
- when Modbus or Sensus output is in use

Mains supply (option – remote only)

- 95 to 240 V AC, 50/60 Hz, 3 VA
- Mains connection cable: approx. 3 m (9.8 ft)

Internal backup power time for:

- DN40 to 200: 16 days
- DN250 to 600: 6 days
- DN700 to 2400: 3 days

Renewable power (option)

- Solar or wind
- Input voltage: 6 to 32 V DC @ 5 W
- Max. current: 200 mA

Internal backup time for:

- DN40 to 200: 48 days
- DN250 to 600: 18 days
- DN700 to 2400: 9 days

Note. Renewable energy generators do not operate at maximum capacity. For example, low wind speeds, dirty solar panels and shorter daylight periods all reduce capacity. Consequently, some installations may require generators with a capacity greater than the specified 5 W minimum.

Inputs

- IP68 connectors, mains cable (remote only)
- Sensor cable (remote only). ABB sensor cable supplied as standard. SWA cable available (via adapter box) on application
- Pressure transducer connection (option)

Configuration/User interface

ABB Velox Interface app on a compatible tablet or smartphone. Operating systems of smartphone or tablet are Android (Oreo or newer). Functions of Velox Interface include configuration, diagnostics, logger data retrieval and transmitter flash update.

Outputs

- Pulse/Alarm
- RS485 Modbus
- Sensus protocol

Pulse outputs (option)

- Passive Output 1: forward pulses
- Passive Output 2: reverse pulses
- +35 V @ 20 mA solid state, unipolar
- Isolated with one common, shared with alarm output max. ± 50 V to earth
- 50 Hz max., programmable pulse width, default 2 ms *

* Increasing pulse width beyond 2 ms at frequencies greater than 10 Hz reduces battery life

Modbus interface (option)

- Modbus RTU over 2-wire EIA-485
- Supported baud rates: 9600 and 19200
- Max. devices on bus segment: 32
- Max. response time, 1 registered read: 60 ms
- Max. response time, 1 registered write: 600 ms

Alarm outputs (option)

- Indicates any problem with measurement, power supply or flowrate alarm
- Bi-directional, solid state
- +35 V @ 50 mA
- Isolated with one common, shared with pulse outputs

Automatic meter reading (AMR)

3-wire Sensus compatible

Logger

Logger function	Flow and pressure	Forward, reverse, and net flow totals
No. of records	45871	3120
Logging interval *	15 seconds 30 seconds 1 minute 5 minutes 15 minutes (selectable)	24 hours (fixed)
Logger capacity	31 days @ 1 minute 477 days @ 15 minutes	8 years

* Based on a default 15 second measurement rate when operating on battery or renewable power

Retrieval of logger data file via smartphone/tablet – see

Configuration/User interface on page 12

Logger data file format

- .csv for easy import into databases/spreadsheets
- Time-stamped records with flow, pressure and totalizers in user-configured units of measurement

Response time (programmable)

- >0.1 second (mains-powered)
- 15 seconds (battery-powered + external renewable energy)

Environmental and operating conditions

Ingress rating

IP68 (NEMA 6P), <2 m (6 ft)

Submerged

9 months accrued time

Humidity

0 to 100 %

Temperature ranges

Storage: -20 to 60 °C (-4 to 140 °F)

Ambient: -25 to 60 °C (-13 to 140 °F)

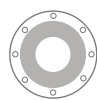
Transmitter vibration

IEC 60068-2-6 (2007)

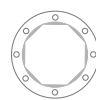
Vibration level 2g

Options

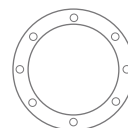
Compatible sensor styles



Reduced
bore
DN40 to
600



Virtual full
bore
DN40 to
200



Full
bore
DN250 to
2400



Probe
300 to
1000 mm

External pressure transducer (option)

Up to 20 and 40 bar absolute

Backward compatibility (option)

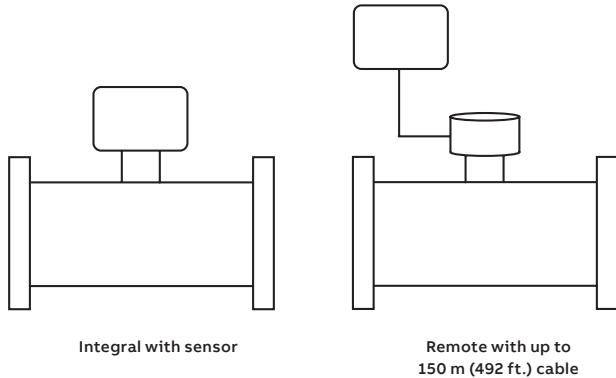
- Full compatibility with legacy AquaMaster remote sensors. Plugs directly into AquaMaster4 with no specific configuration required.

MID/Tamper detection (option)

- Switch selectable inside the tamper-evident, seal-protected enclosure
- Prevents changes to meter configuration that affect the meter/output accuracy

Specification– transmitter (FEX45X)

Mounting on flow sensor



Power supply



Battery

AC mains

Solar

Wind

Battery power

6/4 lithium thionyl chloride 'D' batteries.

Note. The following batteries work with the product:

- SAFT LS33600 *
- Eve ER34615 *
- GB Battery ER34615
- cT-energy ER34615
- OmniCel ER34615
- GEBC ER34615
- LiYa ER34615
- Fanzo ER34615H

* Preferred

Nominal External Battery Power Supply Unit (PSU) only: FTPS/FTP

Sensor style	Size	Integral	Remote
Reduced bore	DN40 to 80	8.5 years	7 years
	DN100 to 300	7 years	6.5 years
	DN350 to 600	7 years	6 years
Octagonal bore	DN40 to 200	8.5 years	7 years
Full bore	DN250 to 600	7 years	6 years
	DN700 to 2400	4 years	4 years

MQTTS/MQTT with Sparkplug B

Sensor style	Size	Integral	Remote
Reduced bore	DN40 to 80	11 years	9 years
	DN100 to 300	9 years	7.5 years
	DN350 to 600	8.5 years	7.5 years
Octagonal bore	DN40 to 200	11 years	9 years
Full bore	DN250 to 600	8.5 years	7.5 years
	DN700 to 2400	4.5 years	4 years

Test conditions:

- acquisition = 15 seconds
- pulse output = 2 Hz @ 5 ms
- alarm output on = 25 %
- logger rate = 1 minute
- with pressure
- integral verification self check = 15 minutes
- ambient temperature = 20 °C
- mobile communication transmission interval of:
 - 24 h for Detailed Report through 4G over FTPS/FTP/MQTTS/MQTT with Sparkplug B, or- 6 h for Summary Report through NB - IoT over LwM2M
- Battery capacity and life are significantly shortened:
 - when the operating environment temperature ranges between -20 and 0 °C or 50 and 70 °C (-4° and 32 °F or 122 and 158 °F)

- when data acquisition is less than 15 seconds
- when pulse output width > 5 ms and output frequency is set high
- with extended NFC interface use
- Class 2/Class 1 calibration to OIML R49 & MID options (CM2 & CM1 in ordering code)
- when Modbus output is in use
- with extended use of mobile communications

Mains supply (option – remote only)

- 95 to 240 V AC, 50/60 Hz, 3 VA
- Mains connection cable: approx. 3 m (9.8 ft)

Renewable power (option)

- Solar or wind
- Input voltage: 6 to 32 V DC @ 5 W
- Max. current: 200 mA

Internal backup time for:

- DN40 to 200: 5 days
- DN250 to 600: 3 days
- DN700 to 2400: 1 day

Note. Renewable energy generators do not operate at maximum capacity. For example, low wind speeds, dirty solar panels and shorter daylight periods all reduce capacity. Consequently, some installations may require generators with a capacity greater than the specified 5 W minimum.

Nominal External Backup Power for Mains and Renewable Power Supply Unit (PSU) FTPS/FTP:

Sensor style	Size	Integral	Remote
Reduced bore	DN40 to 80	5.5 years	5 years
	DN100 to 300	5 years	4 years
	DN350 to 600	4.5 years	4 years
Octagonal bore	DN40 to 200	5.5 years	5 years
Full bore	DN250 to 600	4.5 years	4 years
	DN700 to 2400	2.5 years	2.5 years

Note. Test conditions are the same as for battery-operated transmitter with 4 batteries only.

MQTTS/MQTT with Sparkplug B

Sensor style	Size	Integral	Remote
Reduced bore	DN40 to 80	6.5 years	5 years
	DN100 to 300	5.5 years	4.5 years
	DN350 to 600	5 years	4.5 years
Octagonal bore	DN40 to 200	6.5 years	5.5 years
Full bore	DN250 to 600	5 years	4.5 years
	DN700 to 2400	3 years	3 years

Battery change-over backup time

- Approximately 2 minutes

Antenna

- Internal
- External (option)

Note. Mobile communications do not operate if the internal antenna is under water. The general advice is to mount the antenna as high as possible, always outside of any metal enclosures and not under the surface of the ground.

Inputs

- IP68 connectors, mains cable (remote only)
- Sensor cable (remote only). ABB sensor cable supplied as standard. SWA cable available (via adapter box) on application
- Pressure transducer connection (option)

Configuration/User interface

ABB Velox Interface app on a compatible tablet or smartphone. Operating systems of smartphone or tablet are Android (Oreo or newer). Functions of Velox Interface include configuration, diagnostics, logger data retrieval and transmitter flash update.



IMPORTANT (NOTE)

Please ensure all required regulatory approvals are in place before you put the FEX45X transmitter in use.

Outputs

- Pulse/Alarm
- RS485 Modbus
- Mobile communications (4G fall back to 3G/NB-IoT)

Pulse outputs (option)

- Passive Output 1: forward pulses
- Passive Output 2: reverse pulses
- +35 V @ 20 mA solid state, unipolar
- Isolated with one common, shared with alarm output
Max ±50 V to earth
- 50 Hz max., programmable pulse width, default 2 ms*

* Increasing pulse width beyond 2 ms at frequencies greater than 10 Hz reduces battery life

Modbus interface (option)

- Modbus RTU over 2-wire EIA-485
- Supported baud rates: 9600 and 19200
- Max. devices on bus segment: 32
- Max. response time, 1 registered read: 60 ms
- Max. response time, 1 registered write: 600 ms

Alarm outputs (option)

- Indicates any problem with measurement, power supply or flowrate alarm
- Bi-directional, solid state
- +35 V @ 50 mA
- Isolated with one common, shared with pulse outputs

Mobile communications – 4G/3G

- 4G LTE Cat1 with fall back to 3G (HSPA/HSPA+)
- Data exchange via FTPS/FTP or MQTTS/MQTT Sparkplug B (V 3.0.0) (TLS1.2 encryption with digital certificate based mutual authentication) protocol
- Data exchange format configurable to CSV/JSON
- Data exchange interval, 15 mins, 30 mins, 1 hour, 2 hours, 4 hours, 6 hours, 8 hours, 12 hours or 24 hours configurable

Mobile communications – NB – IoT

- NB – IoT over China Telecom
- Data exchange via LwM2M (DTLS 1.2 encryption)
- Data exchange format JSON (JavaScript Object Notation) for China Telecom
- Data exchange interval 1 hour, 6 hours, 12 hours or 24 hours configurable

Logger

Logger function	Flow, pressure, forward, reverse, and net flow totals
No. of records	45792
Logging interval *	15 seconds 30 seconds 1 minute 5 minutes 15 minutes (selectable)
Logger capacity	31 days @ 1 minute 477 days @ 15 minutes

* Based on a default 15 second measurement rate when operating on battery or renewable power

Logger data file format

- .csv for easy import into databases/spreadsheets
- Time-stamped records with flow, pressure and totalizers in user-configured units of measurement

Audit logger

- Time-stamped records for all events, such as configuration changes, diagnostics, regular alarms and critical alarms (firmware update, change of totalizer, roll over of totalizer, reset of totalizer).

- stored as standard (3000 records) and critical (1000 records) events in separate database.
- available as .csv for easy import into databases/spreadsheets

Response time (programmable)

>0.1 second (mains-powered)

15 seconds (battery-powered + external renewable energy)

Report types in mobile communications

- Summary report with totalizer (fwd., reverse and net), flow rate, alarm status (OK/Not OK), signal quality, and battery life along with Pressure
- Detail report with totalizer (fwd., reverse, and net), flow rate, pressure log, alarm, signal quality, battery life
- Diagnostic alarm report

Remote requests through mobile communications

- Summary report, detail report, and audit log report
- Firmware update
- Configuration changes
- Device Certificate update

...Specification – transmitter (FEX45X)

Environmental and operating conditions

Ingress rating

IP68 (NEMA 6P), <2m (6 ft.), for 360 hours (Tested according to IEC 60529)

Humidity

0 to 100 %

Temperature ranges

Storage: -20 to 60 °C (-4 to 140 °F)

Ambient: -25 to 60 °C (-13 to 140 °F)

Environmental classification

O, M1 and E2 for internal antenna devices & E1 for external antenna devices

Transmitter vibration

IEC 60068-2-6 (2007)

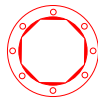
Vibration level 2g

Options

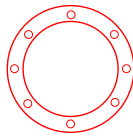
Compatible sensor styles



Reduced bore
DN40 to 600



Octagonal bore
DN40 to 200



Full bore
DN250 to 2400

External pressure transducer (option)

Up to 20 and 40 bar absolute

Backward compatibility (option)

- Full compatibility with legacy AquaMaster remote sensors. Plugs directly into AquaMaster 4 with no specific configuration required. Note the transmitter is not compatible with legacy telemetry applications and software applications

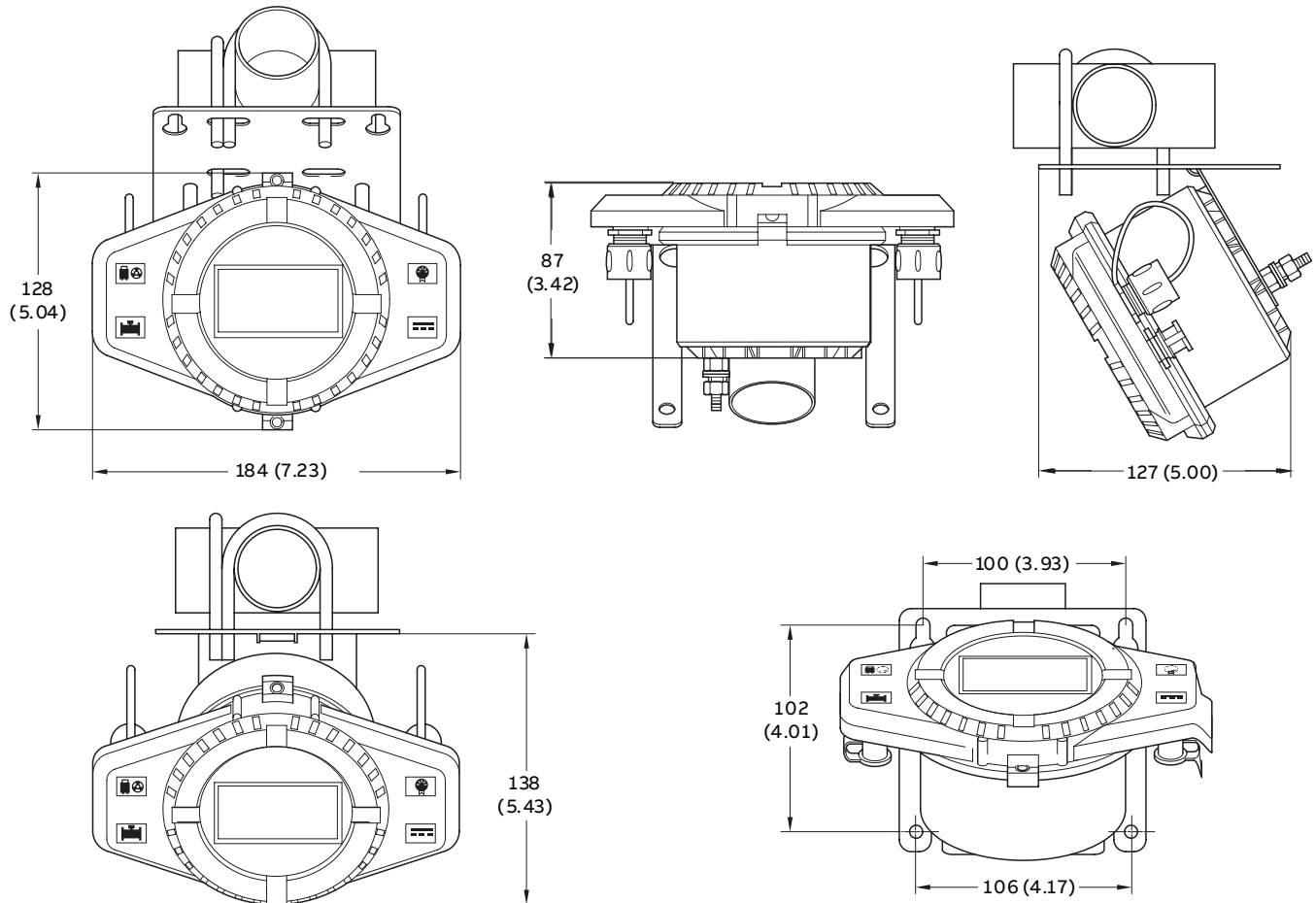
Read-only switch

- Switch selectable inside the SIM card chamber
- Prevents changes to meter configuration that affect the meter/output accuracy

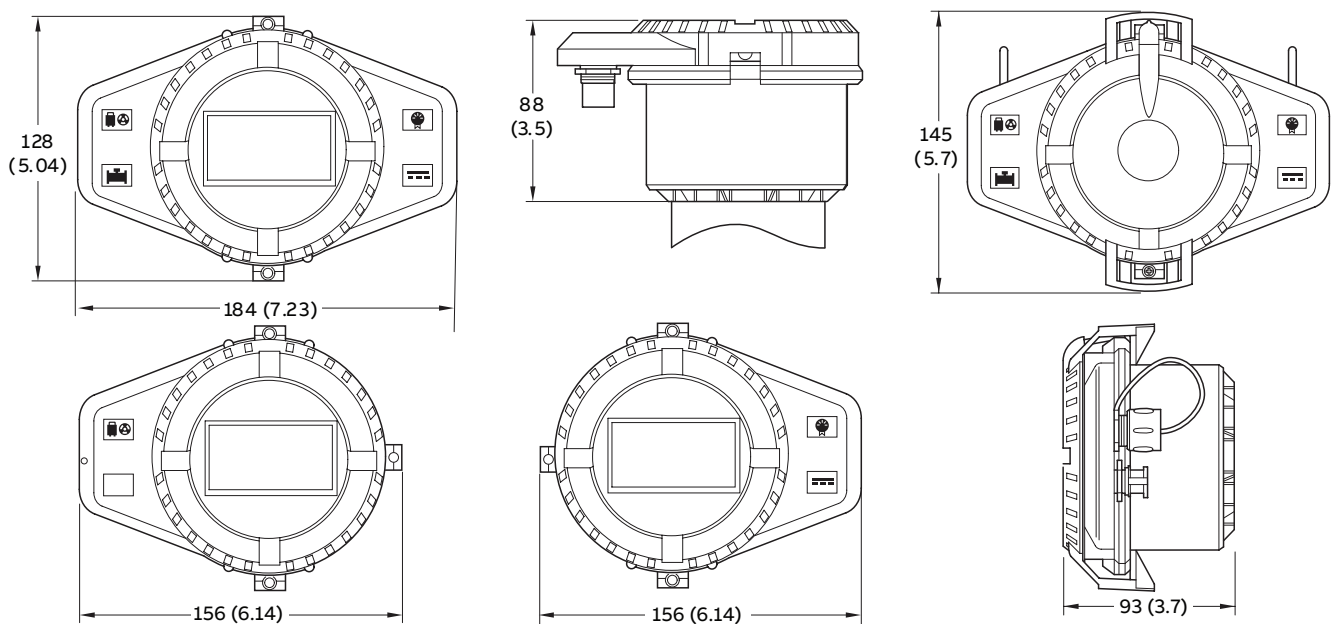
Specification

Dimensions – transmitter (41X/43X)

Dimensions in mm (in)



Wall-/Pipe-mount remote transmitter



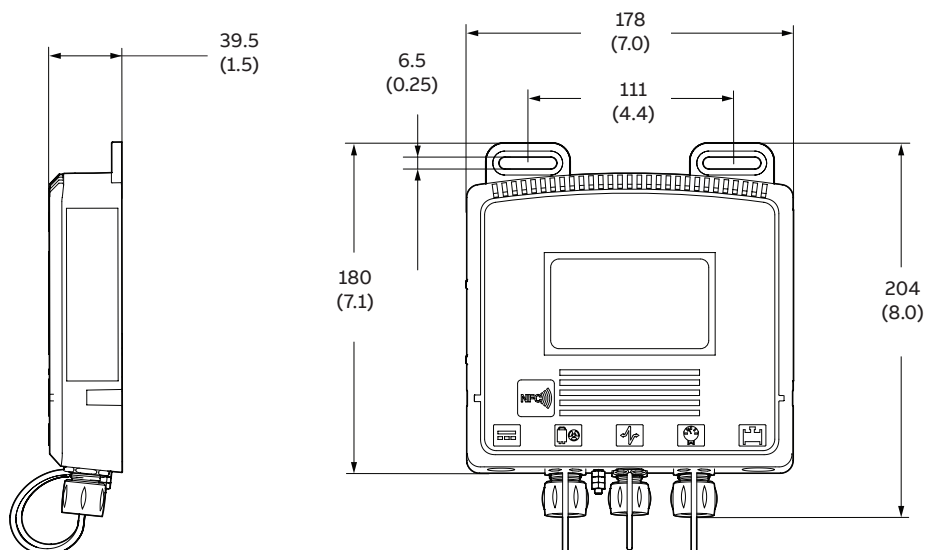
Integral transmitter

Transmitter with NFC aerial cover

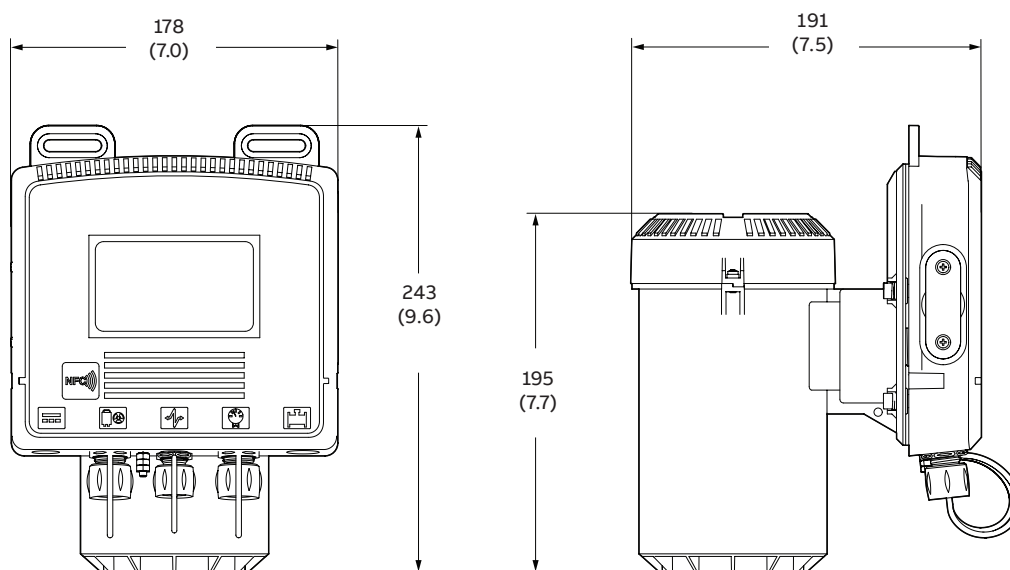
...Specification

Dimensions – FET450

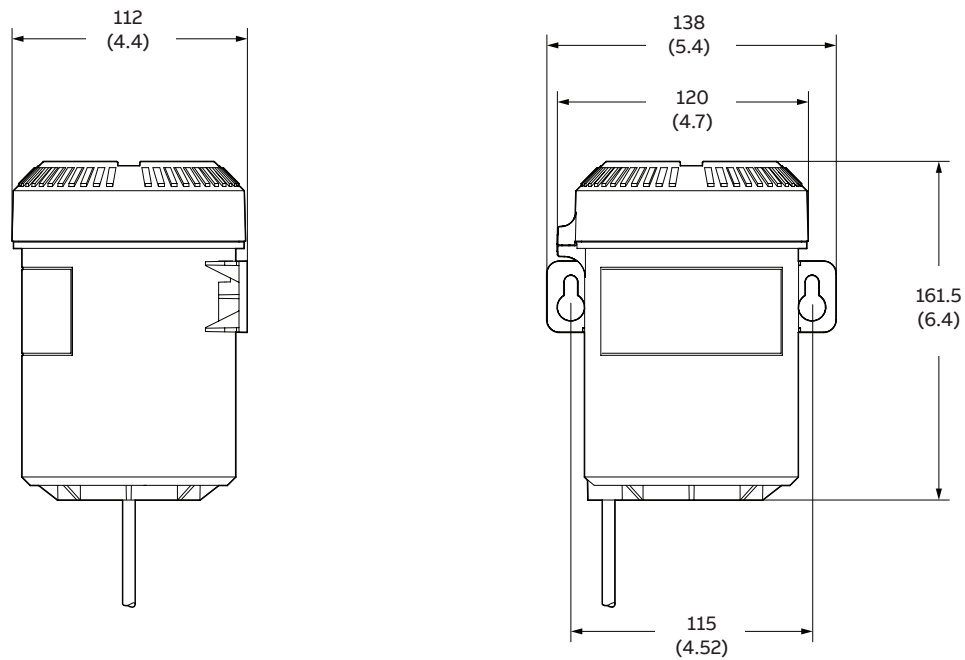
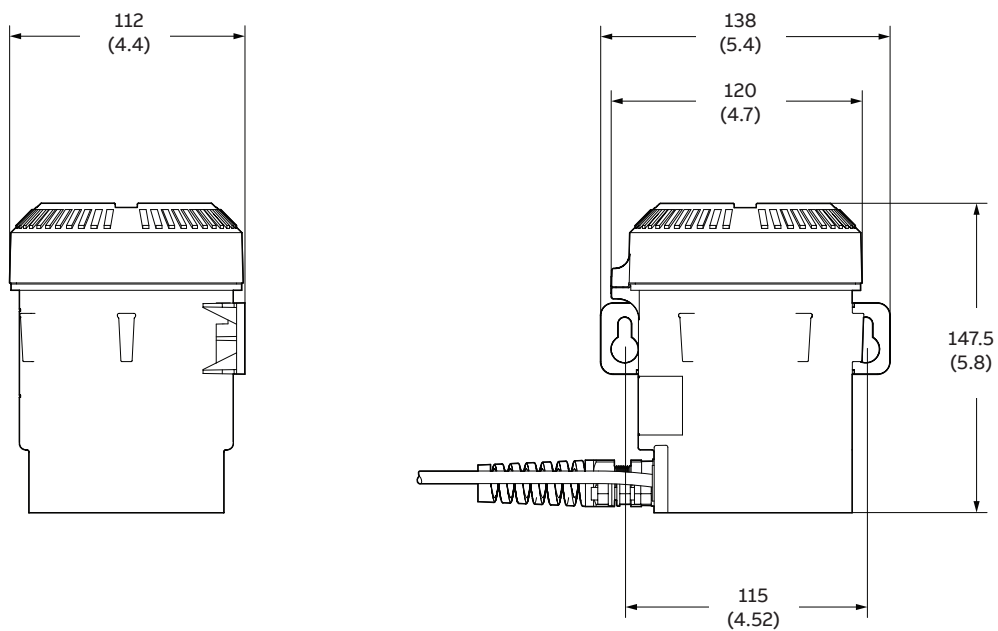
Dimensions in mm (in)



Wall-/Pipe-mount remote transmitter

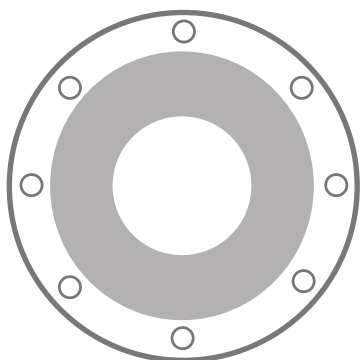


Integral transmitter

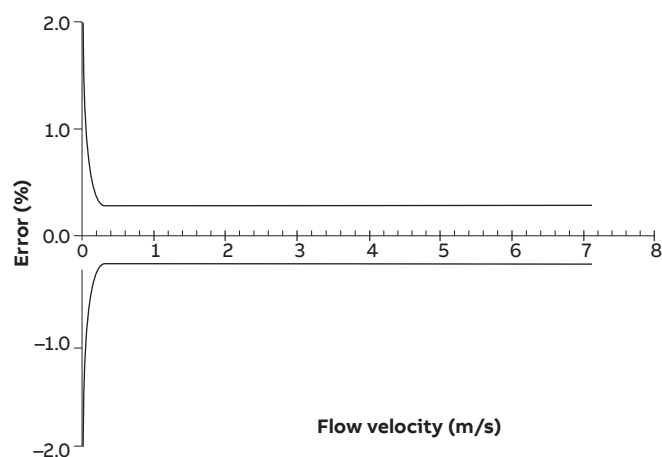
Dimensions – Power supply unit for FET452**Battery power supply unit (PSU)****Mains/renewable power supply unit (PSU)**

...Specification

Reduced bore sensor



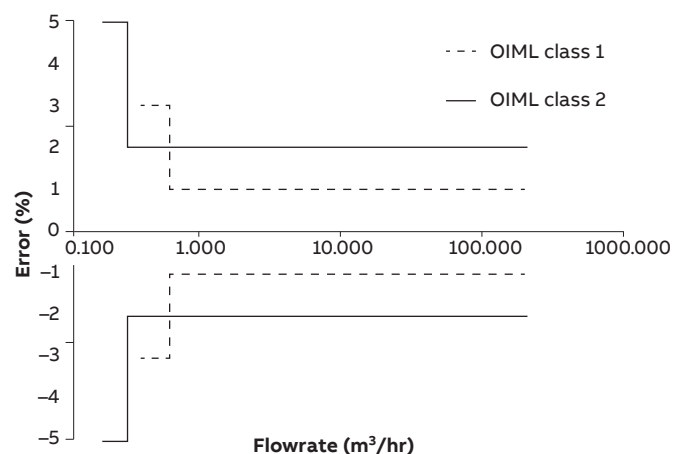
Measurement accuracy



DN	Mains powered		Battery/Renewable energy powered	
	Class 2 ±0.5 or ±0.4 %	Class 1 ±0.2 %	Class 2 ±0.5 or ±0.4 %	Class 1 ±0.2 %
40 to 600	±1 mm/s *	±0.5 mm/s *	±2 mm/s *	±1 mm/s *

* Whichever is the greater

Metrological performance to OIML R49:2013



DN	in	Q3 (m³/h)	Mains powered		Battery/Renewable energy powered	
			Class 2 (R = 1000)	Class 1 (R = 500)	Class 2 (R = 400)	Class 1 (R = 160)
			Q1 (m³/h)	Q1 (m³/h)	Q1 (m³/h)	Q1 (m³/h)
40	1½	25	0.025	0.05	0.063	0.16
50	2	40	0.04	0.08	0.10	0.25
65	2½	63	0.063	0.13	0.16	0.39
80	3	100	0.10	0.20	0.25	0.63
100	4	160	0.16	0.32	0.40	1
125	5	160	0.16	0.32	0.40	1
150	6	400	0.40	0.80	1	2.50
200	8	630	0.63	1.26	1.58	3.94
250	10	1000	1	2	2.50	6.25
300	12	1600	1.60	3.20	4	10
350	14	1600	1.60	3.20	4	10
400	16	2500	2.50	5	6.25	15.63
450	18	2500	2.50	5	6.25	15.63
500	20	4000	4	8	10	25
600	24	6300	6.30	12.60	15.75	39.38

$$Q2 = 1.6 * Q1$$

$$Q4 = 1.25 * Q3$$

$$Q3/Q1 = R$$

DN	in	Q3 (US gal/min)	Mains powered		Battery/Renewable energy powered	
			Class 2 (R = 1000)	Class 1 (R = 500)	Class 2 (R = 400)	Class 1 (R = 160)
			Q1 (US gal/min)	Q1 (US gal/min)	Q1 (US gal/min)	Q1 (US gal/min)
40	1½	110	0.11	0.22	0.28	0.69
50	2	176	0.18	0.35	0.44	1.10
65	2½	277	0.28	0.55	0.69	1.73
80	3	440	0.44	0.88	1.10	2.75
100	4	704	0.70	1	1.76	4.40
125	5	704	0.70	1	1.76	4.40
150	6	1761	1.76	3.52	4.40	11
200	8	2774	2.77	5.55	6.93	17.34
250	10	4403	4.40	8.81	11	27.52
300	12	7045	7	14	17.61	44
350	14	7045	7	14	17.61	44
400	16	11007	11	22	27.52	68.79
450	18	11007	11	22	27.52	68.79
500	20	17611	17.61	35.22	44	110
600	24	27738	27.7	55.5	69	173

$$Q2 = 1.6 * Q1$$

$$Q4 = 1.25 * Q3$$

$$Q3/Q1 = R$$

Bore sizes and flange types

Bore size range

DN40 to 600

Flanges to standards

ASME

AWWA

ISO 7005 EN1092-1

DIN

AS4087

AS2129

JIS

Pressure limitations for flanges

As per flange rating

PN25 max. process temperature 50 °C (122 °F)

PN40 max. process temperature 40 °C (104 °F)

Pressure equipment directive 97/23/EC

This product is applicable in networks for the supply, distribution and discharge of water and associated equipment and is therefore exempt.

Bore and flange material

- DN40 to 200: SG iron
- DN250 to 600: carbon steel
- All sizes (DN 40 - 600) coated with light gray 2-pack epoxy (RAL9002)
- Primer: Interpon PZ660 zinc-based system, 70 microns thick
- Top coat: Interpon 610 light gray polyester powder coating (RAL 9002), up to 150 microns thick, comparable to EN ISO 12944 grade C4
- As a special requirements: 2-pack epoxy primer/finish @ 300 µm DFT

Terminal box for remote sensors

Polycarbonate

Environmental and process conditions

Ingress rating

- IP68 (NEMA 6P) to 10 m (33 ft) for continuous submersion (Tested for 1500 hours according to IEC 60529)
- For buriable applications: 1 m < sensor depth ≤ 5 m

Temperature ranges

Ambient: -25 to 70 °C (-13 to 158 °F)

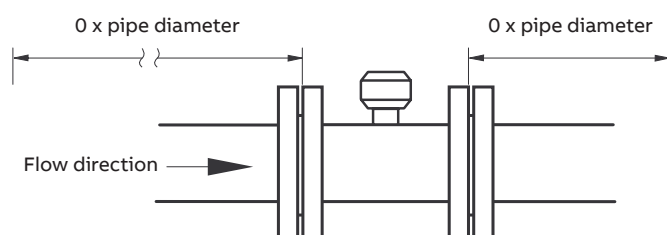
Process: -6 to 70 °C (21 to 158 °F)

Ambient (OIML R49): -25 to 55 °C (-13 to 131 °F)

Conductivity

>20 µS/cm

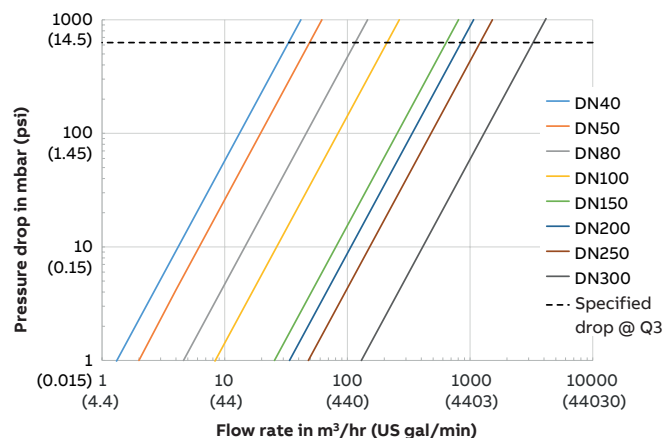
Upstream and downstream pipe conditions



Pressure loss

Flow rate	Pressure loss in bar (psi)
Q ₃	DN40 - 50 < 0.4 (5.8)
Q ₃	DN65 - 600 < 0.63 (9.1)
Q ₃ / 2	< 0.16 (2.3)

Reduced bore sensor pressure drop (typical)



Potable water approvals

WRAS*

ACS#

NSF – 61#

AZ/NZS 4020*

Approvals, certification and safety

NSF

Certified to NSF/ANSI/CAN 61-G



* Material approval

#Meter Approval

...Specification

...Reduced bore sensor

Metrological certifications

- OIML R49:2013 for accuracy class 1 and 2 and water temperature class T50 0.1 to 50 °C (32.18 to 122 °F)
- Environmental class: O, M1 ,E1** and E2*
- MID MI-001
- NMI 10 for Australia
- PAC for China

DN	in	Q3 (m ³ /h)	Mains powered			Battery/Renewable energy powered		
			Class 2.5 (R = 630)	Class 2 (R = 1000)	Class 1 (R = 500)	Class 2.5 (R = 250)	Class 2 (R = 400)	Class 1 (R = 160)
			Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)
40	1½	25	0.04	0.025	0.05	0.1	0.062	0.062 ⁽³⁾
50	2	40	0.063	0.04	0.08	0.16	0.1	0.1 ⁽³⁾
65	2½	63	0.1	0.063	0.063 ⁽²⁾	0.252	0.157	0.39
80	3	100	0.159	0.1	0.1 ⁽²⁾	0.4	0.25	0.625
100	4	160	0.254	0.16	0.32	0.64	0.4	1
125	5	160	0.254	0.16	0.32	0.64	0.4	1
150	6	400	0.63	0.4	0.4 ⁽²⁾	1.6	1	1 ⁽³⁾
200	8	630	1	0.63	0.63 ⁽²⁾	2.52	1.575	1.575 ⁽³⁾
250	10	1000	1.59	1	2	4	2.5	6.25
300	12	1600	2.54	1.6	3.2	6.4	4	10
350	14	1600	2.54	1.6	3.2	6.4	4	10
400	16	2500	7.94 ⁽⁷⁾	5 ⁽¹⁾	5	20 ⁽⁸⁾	12.5 ⁽⁴⁾	15.63
450	18	2500	7.94 ⁽⁷⁾	5 ⁽¹⁾	5	20 ⁽⁸⁾	12.5 ⁽⁴⁾	15.63
500	20	4000	6.35	4	8	63.5 ⁽⁹⁾	40 ⁽⁵⁾	100 ⁽⁶⁾
600	24	6300	10	6.3	12.6	100 ⁽⁹⁾	63 ⁽⁵⁾	157.5 ⁽⁶⁾

(1) R = 500, (2) R = 1000, (3) R = 400, (4) R = 200, (5) R = 100 (6) R = 40 (7) R = 315 (8) R = 125 (9) R = 63

Q2 = 1.6 * Q1

Q4 = 1.25 * Q3

Q3/Q1 = R

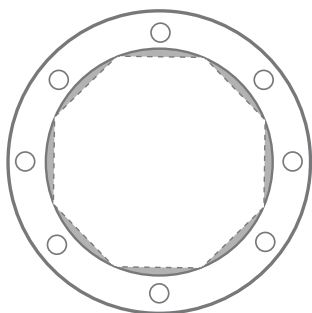
UL Fire Service approval (41X/43X)

Size	UL low flow GPM	UL high flow GPM	Pressure drop (psi)
2	6	235	≤ 10
2½	6.5	280	≤ 9
3	6	465	≤ 7
4	10	630	≤ 6
6	20	1780	≤ 4
8	20	3345	≤ 8
10	45	4450	≤ 6
12	85	5245	≤ 2

* Applicable only for internal antenna devices of FEX45X & all options of FEX43X

** Applicable for external antenna devices of FEX45X

Full bore sensor



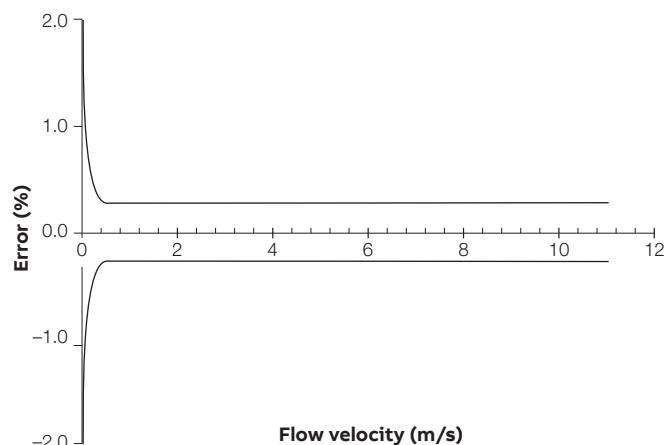
DN40 to 200

Virtual full bore, polypropylene liner

DN250 to 2400

Full bore, elastomer or hard rubber liner

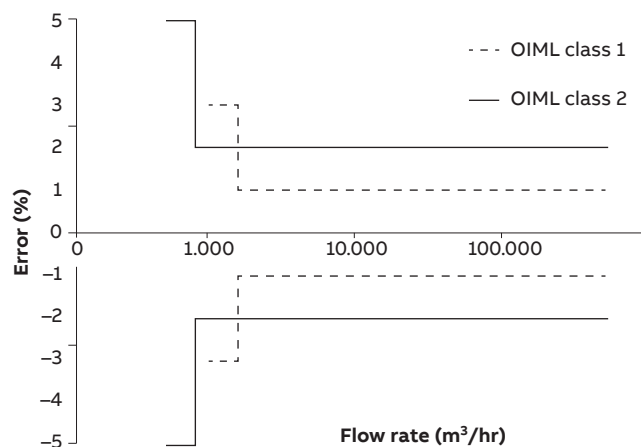
Measurement accuracy



DN	Mains powered		Battery/Renewable energy powered	
	Class 2 ±0.5 or ±0.4 %	Class 1 ±0.2 %	Class 2 ±0.5 or ±0.4 %	Class 1 ±0.2 %
40 to 600	±2 mm/s *	±1 mm/s *	±4 mm/s *	±2 mm/s *
700 to 2400	±4 mm/s *	±2 mm/s *	±6 mm/s *	±3 mm/s *

* whichever is the greater

Metrological performance to OIML R49:2013



DN	in	Q3 (m³/h)	Mains powered		Battery/Renewable energy powered	
			Class 2 (R = 500)	Class 1 (R = 250)	Class 2 (R = 250)	Class 1 (R = 125)
			Q1 (m³/h)	Q1 (m³/h)	Q1 (m³/h)	Q1 (m³/h)
40	1½	40	0.08	0.16	0.16	0.32
50	2	63	0.13	0.25	0.25	0.50
65	2½	100	0.20	0.40	0.40	0.80
80	3	160	0.32	0.64	0.64	1.28
100	4	250	0.50	1	1	2
125	5	250	0.50	1	1	2
150	6	630	1.26	2.52	2.52	5.04
200	8	1000	2	4	4	8
250	10	1600	3.20	6.40	6.40	12.80
300	12	2500	5	10	10	20
350	14	4000	8	16	16	32
400	16	4000	8	16	16	32
450	18	6300	12.60	25.20	25.20	50.40
500	20	6300	12.60	25.20	25.20	50.40
600	24	10000	20	40	40	80

DN	in	Q3 (m³/h)	Mains powered		Battery/Renewable energy powered	
			Class 2 (R = 315)	Class 1 (R = 160)	Class 2 (R = 160)	Class 1 (R = 80)
			Q1 (m³/h)	Q1 (m³/h)	Q1 (m³/h)	Q1 (m³/h)
700	28	16000	50.79	100	100	200
750	30	16000	50.79	100	100	200
800	32	16000	50.79	100	100	200
900	36	25000	79.37	156.20	156.25	312
1000	40	25000	79.37	156.20	156.25	312
1050	42	25000	79.37	156.20	156.25	312
1100	44	40000	126.98	250	250	500
1200	48	40000	126.98	250	250	500
1350	54	63000	200.00	393.7	393.75	787
1400	56	63000	200.00	393.70	393.75	787
1500	60	63000	200.00	393.70	393.75	787
1600	64	63000	200.00	393.70	393.75	787
1650	66	63000	200.00	393.7	393.7	787
1800	72	100000	317.46	625	625	1250
1950	78	100000	317.46	625	625	1250
2000	80	100000	317.46	625	625	1250
2100	84	100000	317.46	625	625	1250
2200	88	160000	507.94	1000	1000	2000
2400	96	160000	507.94	1000	1000	2000

Q2 = 1.6 * Q1

Q4 = 1.25 * Q3

Q3/Q1 = R

...Specification

...Full bore sensor

DN	in	Q3 (US gal/ min)	Mains powered		Battery/Renewable energy powered	
			Class 2 (R = 500)	Class 1 (R = 250)	Class 2 (R = 250)	Class 1 (R = 125)
			Q1 (US gal/ min)	Q1 (US gal/ min)	Q1 (US gal/ min)	Q1 (US gal/ min)
40	1½	176	0.35	0.70	0.7	1.41
50	2	277	0.55	1.11	1.11	2.22
65	2½	440	0.88	1.76	1.76	3.52
80	3	704	1.41	2.82	2.82	5.64
100	4	1101	2.20	4	4.40	8.81
125	5	1101	2.20	4	4.40	8.81
150	6	2774	5.55	11.10	11.10	22.2
200	8	4403	8.8	17.6	17.6	35.2
250	10	7045	14.09	28.2	28.2	56.4
300	12	11007	22	44	44	88
350	14	17611	35	70	70.4	141
400	16	17611	35	70	70.4	141
450	18	27738	55.48	111	111	222
500	20	27738	55.48	111	111	222
600	24	44029	88	176	176	352

$$Q2 = 1.6 * Q1$$

$$Q4 = 1.25 * Q3$$

$$Q3/Q1 = R$$

			Class 2 (R = 315)	Class 1 (R = 160)	Class 2 (R = 160)	Class 1 (R = 80)
700	28	70446	224	440	440	881
750	30	70446	224	440	440	881
800	32	70446	224	440	440	881
900	36	110072	349	688	688	1374
1000	40	110072	349	688	688	1374
1050	42	110072	349	688	688	1374
1100	44	176115	559	1101	1101	2201
1200	48	176115	559	1101	1101	2201
1350	54	277381	881	1733	1734	3465
1400	56	277381	881	1733	1734	3465
1500	60	277381	881	1733	1734	3465
1600	64	277381	881	1733	1734	3465
1650	66	277381	881	1733	1734	3465
1800	72	440287	1398	2752	2752	5504
1950	78	440287	1398	2752	2752	5504
2000	80	440287	1398	2752	2752	5504
2100	84	440287	1398	2752	2752	5504
2200	88	704459	2236	4403	4403	8806
2400	96	704459	2236	4403	4403	8806

$$Q2 = 1.6 * Q1$$

$$Q4 = 1.25 * Q3$$

$$Q3/Q1 = R$$

Bore sizes and flange types

Bore size range

DN40 to 2400

Flanges to standards

ASME

AWWA

ISO 7005 EN1092-1

DIN

AS4087

AS2129

JIS

Pressure limitations for flanges

As per flange rating

PN25 max. process temperature 50 °C (122 °F)

PN40 max. process temperature 40 °C (104 °F)

Pressure equipment directive 97/23/EC

This product is applicable in networks for the supply, distribution and discharge of water and associated equipment and is therefore exempt.

Bore and flange material

- DN40 to 200: SG iron
- DN250 to 2400: carbon steel
- Sizes DN40 to 200 coated with light gray 2-pack epoxy (RAL9002)
 - Primer: Interpon PZ660 zinc-based system, 70 microns thick
 - Top coat: Interpon 610 light gray polyester powder coating (RAL 9002), up to 150 microns thick, comparable to EN ISO 12944 grade C4
 - As a special requirements: 2-pack epoxy primer/ finish @ 300 µm DFT
- Sizes DN250 to 400: In-organic Zinc based system for the flanges and painted Cast aluminum housing (Paint coat ≥ 80 µm, RAL 9002)
- Sizes DN450 to 2400: Welded steel Design (Paint coat ≥ 80 µm, RAL 9002)

Terminal box for remote sensors

Polycarbonate

Environmental and process conditions

Ingress rating

- DN40 - 200 & DN450 - 2400 : IP68 (NEMA 6P) to 10 m (33 ft) for continuous submersion (Tested for 1500 hours according to IEC 60529)
- For buriable applications (DN40 to 200, virtual full bore, polypropylene liner and DN450 to 2400, full bore, rubber liner): $1\text{ m} < \text{sensor depth} \leq 5\text{ m}$
- DN250 - 400: IP68 (NEMA 6P) to 10 m (33 ft) for periodic submersion (Tested for 1500 hours according to IEC 60529)

Temperature ranges

Ambient: -25 to $70\text{ }^{\circ}\text{C}$ (-13 to $158\text{ }^{\circ}\text{F}$)

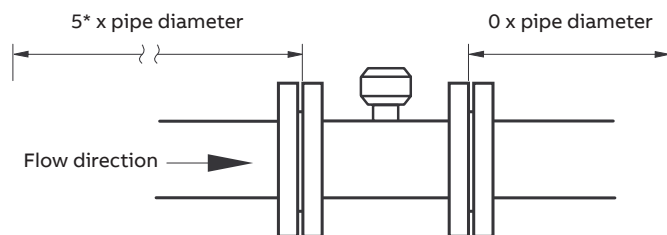
Ambient (OIML R49): -25 to $55\text{ }^{\circ}\text{C}$ (-13 to $131\text{ }^{\circ}\text{F}$)

Liner material	Bore size	Process temperature	
		Minimum	Maximum
Polypropylene	DN40 to 200	$-6\text{ }^{\circ}\text{C}$ ($21\text{ }^{\circ}\text{F}$)	$70\text{ }^{\circ}\text{C}$ ($158\text{ }^{\circ}\text{F}$)
Rubber	DN250 to 2400	$-10\text{ }^{\circ}\text{C}$ ($14\text{ }^{\circ}\text{F}$)	$80\text{ }^{\circ}\text{C}$ ($176\text{ }^{\circ}\text{F}$)

Conductivity

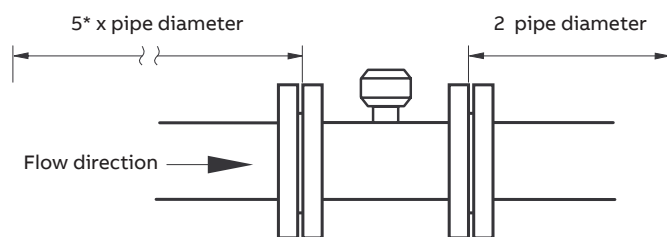
$>20\text{ }\mu\text{S/cm}$

Upstream and downstream pipe conditions (virtual full bore DN40 to 200)



* Upstream 0 X pipe diameter for OIML R49 Class 2 ($\pm 2\%$) accuracy only

Upstream and downstream pipe conditions (full bore DN250 to 2400)

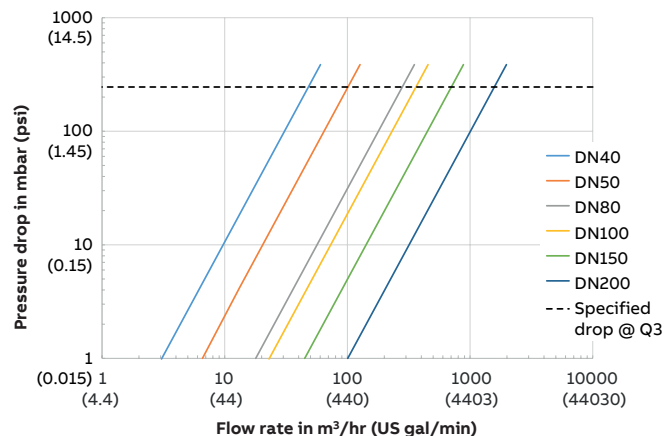


* Upstream 3 X pipe diameter for OIML R49 Class 2 ($\pm 2\%$) accuracy only

Pressure loss

Flow rate	Pressure loss in bar (psi)
Q_3	$<0.1\text{ bar}$ (1.5 psi) for DN40 and DN50 $<0.16\text{ bar}$ (2.4 psi) for DN65 to DN250
Q_3	$<0.1\text{ bar}$ (1.5 psi) for sizes DN250 and larger

Virtual full bore sensor pressure drop (typical)



Potable water approvals

WRAS*

ACS#

NSF – 61#

AZ/NZ 4020*

Approvals, certification and safety NSF

Certified to NSF/ANSI/CAN 61-G



* Material approval

#Meter Approval

...Specification

...Full bore sensor

Metrological certifications

- OIML R49:2013 for accuracy class 1 and 2 and water temperature class T50 0.1 to 50 °C (32.18 to 122 °F)
- Environmental class: O, M1 ,E1** and E2*
- MID MI-001
- NMI 10 for Australia
- PAC for China

DN	in	Q3 (m ³ /h)	Mains powered			Battery/Renewable energy powered		
			Class 2.5 (R = 315)	Class 2 (R = 500)	Class 1 (R = 250)	Class 2.5 (R = 160)	Class 2 (R = 250)	Class 1 (R = 125)
			Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)	Q1 (m ³ /h)
40	1½	40	0.127	0.08	0.08 ⁽¹⁾	0.25	0.16	0.32
50	2	63	0.2	0.126	0.126 ⁽¹⁾	0.394	0.25	0.504
65	2½	100	0.32	0.20	0.20 ⁽¹⁾	0.625	0.40	0.4 ⁽²⁾
80	3	160	0.508	0.32	0.32 ⁽¹⁾	1	0.64	0.64 ⁽²⁾
100	4	250	0.79	0.50	0.5 ⁽¹⁾	1.56	1	1 ⁽²⁾
125	5	250	0.79	0.50	0.5 ⁽¹⁾	1.56	1	1 ⁽²⁾
150	6	630	2	1.26	2.52	3.94	2.52	5.04
200	8	1000	3.17	2	4	6.25	4	8
250	10	1600	5.08	3.20	6.40	10	6.40	12.80
300	12	2500	7.94	5	10	15.625	10	20
350	14	4000	63.5 ⁽⁸⁾	40 ⁽³⁾	40 ⁽³⁾	25.0	16	16 ⁽²⁾
400	16	4000	63.5 ⁽⁸⁾	40 ⁽³⁾	40 ⁽³⁾	25.0	16	16 ⁽²⁾
450	18	6300	100 ⁽⁸⁾	63 ⁽³⁾	63 ⁽³⁾	39.375	25.20	25.2 ⁽²⁾
500	20	6300	100 ⁽⁸⁾	63 ⁽³⁾	63 ⁽³⁾	39.375	25.20	25.2 ⁽²⁾
600	24	6300	100 ⁽⁸⁾	63 ⁽³⁾	63 ⁽³⁾	63 ⁽³⁾	39.37 ⁽⁴⁾	78.75 ⁽⁵⁾
700	28	10000	80 ⁽⁷⁾	50 ⁽⁶⁾	100 ⁽³⁾	158.7 ⁽⁸⁾	100 ⁽³⁾	200 ⁽⁹⁾
750	30	10000	80 ⁽⁷⁾	50 ⁽⁶⁾	100 ⁽³⁾	158.7 ⁽⁸⁾	100 ⁽³⁾	200 ⁽⁹⁾
800	32	10000	80 ⁽⁷⁾	50 ⁽⁶⁾	100 ⁽³⁾	158.7 ⁽⁸⁾	100 ⁽³⁾	200 ⁽⁹⁾
900	36	10000	125 ⁽⁵⁾	80 ⁽⁷⁾	158.7 ⁽⁸⁾	250 ⁽¹⁰⁾	158.7 ⁽⁸⁾	-
1000	40	16000	128 ⁽⁷⁾	80 ⁽⁶⁾	160 ⁽³⁾	254 ⁽⁸⁾	160 ⁽³⁾	-
1050	42	16000	128 ⁽⁷⁾	80 ⁽⁶⁾	160 ⁽³⁾	254 ⁽⁸⁾	160 ⁽³⁾	-
1100	44	16000	200 ⁽⁵⁾	128 ⁽⁷⁾	253.9 ⁽⁸⁾	400 ⁽¹⁰⁾	254 ⁽⁸⁾	-
1200	48	16000	200 ⁽⁵⁾	128 ⁽⁷⁾	253.9 ⁽⁸⁾	400 ⁽¹⁰⁾	254 ⁽⁸⁾	-
1350	54	16000	254 ⁽⁸⁾	200 ⁽⁵⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	-
1400	56	16000	254 ⁽⁸⁾	200 ⁽⁵⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	-
1500	60	16000	254 ⁽⁸⁾	200 ⁽⁵⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	-
1600	64	16000	400 ⁽¹⁰⁾	200 ⁽⁵⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	-
1650	66	16000	400 ⁽¹⁰⁾	200 ⁽⁵⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	400 ⁽¹⁰⁾	-
1800	72	16000	400 ⁽¹⁰⁾	317.5 ⁽⁹⁾	-	-	-	-

(1) R = 500, (2) R = 250, (3) R = 100, (4) R = 160, (5) R = 80, (6) R = 200,

(7) R = 125, (8) R = 63, (9) R = 50, (10) R = 40

Q2 = 1.6 * Q1

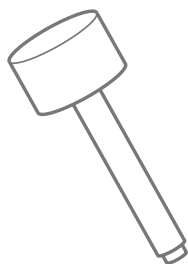
Q4 = 1.25 * Q3

Q3/Q1 = R

* Applicable only for internal antenna devices of FEX45X & all options of FEX43X

** Applicable for external antenna devices of FEX45X

Insertion flowmeter



Mounting

Integral transmitter

On probe sensor

Remote transmitter

Off probe sensor

Insertion details

Size range

300 to 1000 mm (12 to 40 in)

Pipe sizes

200 to 8000 mm (8 to 320 in) nominal bore

Pressure limitations

20 bar (295 psi) absolute

Pressure equipment directive 97/23/EC

This product is applicable in networks for the supply, distribution and discharge of water and associated equipment and is therefore exempt.

Sensor body material

316L stainless steel

Sensor tip material

PEEK

Terminal box material for remote sensors

Polycarbonate

Threaded connection

1 in BSP

1 in NPT

1½ in BSP

Pressure tapping provision

⅜ in BSP

Note: Insertion flow meters are recommended to be used with Metallic pipes only.

Environmental and process conditions

Ingress rating

IP68 (NEMA 6P) to 10 m (33 ft)

Temperature ranges

Ambient: -20 to 60 °C (-4 to 140 °F)

Process: 0 to 60 °C (32 to 140 °F)

Conductivity

>50 µS/cm

Metrological performance and certifications

Velocity accuracy

±2 % of rate or ±2 mm/s (±0.08 in/s)

whichever is the greater

Volume accuracy

Refer to ISO 7145-1982 (BS 1042 section 2.2) for details

Flow condition

Fully developed profile in accordance with ISO 7145-1982 (BS1042 section 2.2.)

Maximum flow

The maximum velocity depends upon the actual insertion length. Typical insertion lengths are 0.125 and 0.5 x pipe diameter. Figure 2 is a guide* to the maximum allowable velocity for different insertion lengths.

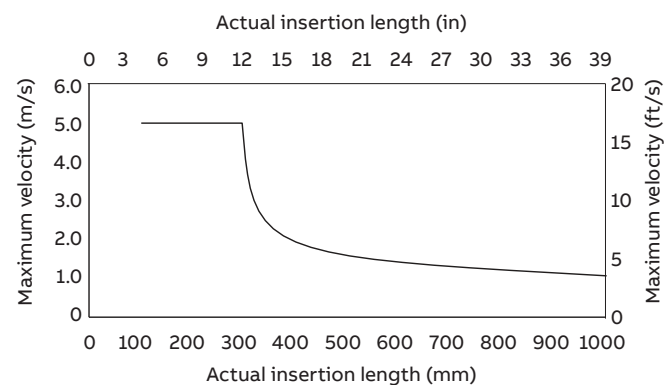


Figure 2 Maximum allowable velocity for different insertion lengths

Potable water approvals for wetted parts

WRAS

ACS

NSF-61

* Figure 2 is intended as a guide only. Factors that influence the maximum insertion length into the pipe include: flow sensor mounting components (for example, standoffs, bushes and valves) pipeline vibration, fluid vibration and pump noise.

...Specification

...Insertion flowmeter

Pressure transducer (option)

Ingress protection

IP68 to 10 m (33 ft)

Wetted parts

303L stainless steel, Viton® and 96 % alumina

Process temperature range

-10 to 50 °C (14 to 122 °F) (protect transducer from frost)

Ambient temperature range

-20 to 70 °C (-4 to 158 °F)

Pressure range (specify when ordering)

20 and 40 bar absolute

Accuracy (typical)

- < ±0.1 % of span + thermal errors
- Thermal zero shift < 0.01 % span/°C
- Thermal span shift < ±0.015 %/°C

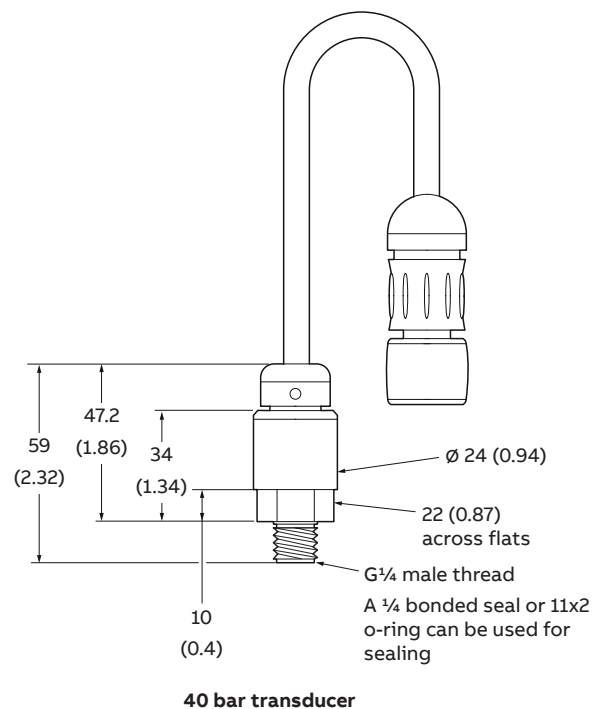
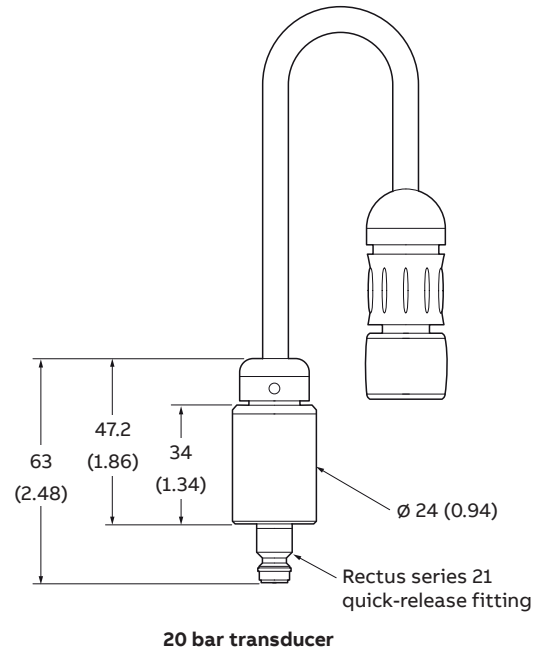
Potable water approvals for wetted parts

WRAS

Dimensions

Dimensions in mm (in)

All dimensions nominal



Dimensions – sensors

R-style sensor – DN 40 to DN 300 (1½ to 12 in)

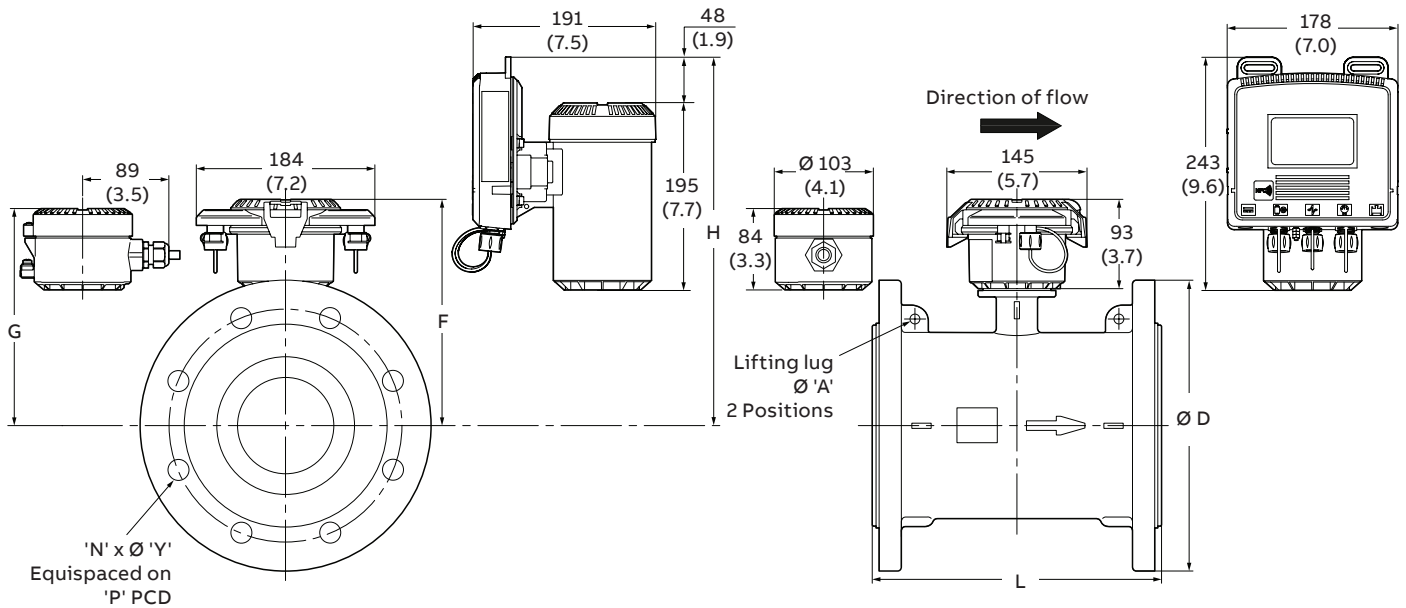


Figure 3 R-style sensor – DN 40 to DN 300 (1½ to 12 in)

Table 1 R-style sensor – DN 40 to DN 80 (1½ to 3 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug	Integral FEW411/FEW431	Remote	Integral FEW451
			D	N	Y	P	L	F	G	H	A			
DN 40 (1½ in)	EN 1092	PN 10, 16, 25	150 (5.9)		19 (0.75)	110 (4.3)								
	ASME B16.5	CL150			15.7 (0.62)	98 (3.9)								
	AS 2129	Table E	135 (5.3)	4	14 (0.55)	95 (3.7)	200 (7.9)	158 (6.2)	149 (5.9)	308 (12.1)	N/A	13 (29)	12 (27)	15 (34)
	JIS B2220	5K	120 (4.7)		15 (0.59)	95 (3.7)		154 (6.1)	144 (5.7)	304 (12.0)		11 (24)	8 (18)	13 (29)
		10K	140 (5.5)		19 (0.75)	105 (4.2)								
DN 50 (2 in)	EN 1092	PN 10, 16, 25	165 (6.5)		19 (0.75)	125 (4.9)								
	ASME B16.5	CL150			19 (0.75)	121 (4.8)			153 (6.0)			15 (32)	14 (30)	17 (38)
	AS 2129	Table E	150 (5.9)	4	18 (0.71)	114 (4.5)	200 (7.9)	162 (6.4)		312 (12.3)	N/A			
	AS 4087	PN 16	130 (5.1)		15 (0.59)	105 (4.1)			152 (6.0)			12 (26)	9 (20)	14 (31)
	JIS B2220	5K	130 (5.1)		15 (0.59)	105 (4.1)								
		10K	155 (6.1)		19 (0.75)	120 (4.7)								
DN 65 (2½ in)	EN 1092	PN 10, 16	185 (7.3)	4	19 (0.75)	145 (5.7)								
	ASME B16.5	CL150		8	20 (0.79)	140 (5.5)								
	AS 2129	Table E	165 (6.5)	4	18 (0.71)	127 (5.0)	200 (7.9)	176 (6.9)	167 (6.6)	326 (12.8)	N/A	19 (42)	18 (40)	21 (47)
	AS 4087	PN 16	155 (6.1)		15 (0.59)	130 (5.1)		168 (6.6)	158 (6.2)	318 (12.5)		14 (31)	11 (24)	16 (36)
	JIS B2220	5K	155 (6.1)		15 (0.59)	130 (5.1)								
		10K	175 (6.9)		19 (0.75)	140 (5.5)								
DN 80 (3 in)	EN 1092	PN 10, 16, 25	200 (7.9)	8	19 (0.75)	160 (6.3)								
	ASME B16.5	CL150			20 (0.79)	152 (6.0)								
	AS 2129	Table E	185 (7.3)	4	18 (0.71)	146 (5.8)	200 (7.9)	181 (7.1)	172 (6.8)	331 (13.0)	N/A	21 (47)	20 (44)	23 (51)
	AS 4087	PN 16	180 (7.1)		15 (0.59)	145 (5.7)		174 (6.9)	165 (6.5)	324 (12.8)		17 (37)	14 (31)	19 (42)
	JIS B2220	5K	180 (7.1)		15 (0.59)	145 (5.7)								
		10K	185 (7.3)	8	19 (0.75)	150 (5.9)								

...R-style sensor – DN 40 to DN 300 (1½ to 12 in)

Sensor size	Flange		Dimensions in mm (in)										Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug				
			D	N	Y	P	L	F	G	H	A	Integral FEW411/FEW431	Remote	Integral FEW451	
DN 100 (4 in)	EN 1092	PN 10, 16	235 (9.3)	8	19 (0.75)	180 (7.1)	250 (9.9)	202 (8.0)	193 (7.6)	352 (13.9)	N/A	27 (60)	26 (58)	29 (64)	
		PN 25			23 (0.91)	190 (7.5)									
	ASME B16.5	CL150	215 (8.5)	4	19 (0.75)	191 (7.5)	212 (8.3)	203 (8.0)	362 (14.3)	23 (51)	20 (44)	25 (56)			
	AS 2129	Table E			18 (0.71)	178 (7.0)									
	AS 4087	PN 16	8	19 (0.75)	195 (7.7)	212 (8.3)	203 (8.0)	362 (14.3)	23 (51)	20 (44)	25 (56)				
	JIS B2220	5K	200 (7.9)	8	165 (6.5)										
		7.5K	238 (9.4)	4	19 (0.75)	195 (7.7)									
		10K	210 (8.3)	8		175 (6.9)									
DN 125 (5 in)	EN 1092	PN 10, 16	270 (10.6)	8	18 (0.71)	210 (8.3)	250 (9.9)	221 (8.7)	212 (8.3)	371 (14.6)	N/A	30 (66)	29 (64)	32 (71)	
		PN 25			28 (1.10)	220 (8.7)									
	ASME B16.5	CL150	255 (10.0)	4	22 (0.87)	216 (8.5)	212 (8.3)	203 (8.0)	362 (14.3)	26 (57)	23 (51)	28 (62)			
	AS 2129	Table E			18 (0.71)	210 (8.3)									
	JIS B2220	5K	235 (9.3)	8	19 (0.75)	200 (7.9)	212 (8.3)	203 (8.0)	362 (14.3)	26 (57)	23 (51)	28 (62)			
		10K	250 (9.8)	8	23 (0.91)	210 (8.3)									
DN 150 (6 in)	EN 1092	PN 10, 16	300 (11.8)	8	23 (0.91)	240 (9.5)	300 (11.8)	233 (9.2)	224 (8.8)	383 (15.1)	10.2 (0.40)	35 (77)	34 (75)	37 (82)	
		CL150			22 (0.87)	242 (9.5)									
	ASME B16.5	PN 25	280 (11.0)	6	26 (1.02)	250 (9.8)	223 (8.8)	383 (15.1)	10.2 (0.40)	33 (73)	31 (68)	35 (78)			
	AS 2129	Table E			22 (0.87)	235 (9.3)									
	AS 4087	PN 16	8	18 (0.71)	230 (9.1)	223 (8.8)	383 (15.1)	10.2 (0.40)	33 (73)	31 (68)	35 (78)				
	JIS B2220	5K	265 (10.4)	6	19 (0.75)							230 (9.1)			
		7.5K	290 (11.4)	8	23 (0.91)	240 (9.5)									
		10K	280 (11.0)	8	23 (0.91)	240 (9.5)									
DN 200 (8 in)	EN 1092	PN 10	370 (14.6)	8	23 (0.91)	295 (11.6)	350 (13.8)	259 (10.2)	249 (9.8)	409 (16.1)	10.2 (0.40)	68 (150)	67 (147)	70 (155)	
		PN 16			28 (1.10)	310 (12.2)									
	ASME B16.5	CL150	335 (13.2)	8	22 (0.87)	298 (11.7)	258 (10.2)	408 (16.1)	51 (112)	48 (106)	53 (117)				
	AS 2129	Table E			18 (0.71)	292 (11.5)									
	AS 4087	PN 16	8	23 (0.91)	280 (11.0)	258 (10.2)	408 (16.1)	51 (112)	48 (106)	53 (117)					
	JIS B2220	5K	320 (12.6)	8	19 (0.75)						299 (11.8)				
		7.5K	342 (8.7)	12	23 (0.91)	290 (11.4)									
		10K	330 (13.0)	12	23 (0.91)	290 (11.4)									
DN 250 (10 in)	EN 1092	PN10	395 (15.6)	12	22 (0.87)	350 (0.87)	450 (17.7)	285 (11.2)	276 (10.9)	435 (17.1)	10.2 (0.40)	78 (172)	75 (165)	80 (177)	
		PN16			26 (1.02)	355 (14.0)									
	ASME B16.5	PN25	405 (15.9)	8	30 (1.18)	370 (14.6)	258 (10.2)	408 (16.1)	51 (112)	48 (106)	53 (117)				
	AS 2129	Table E			22 (0.87)	356 (14.0)									
	AS 4087	PN 16	8	23 (0.91)	345 (13.6)	258 (10.2)	408 (16.1)	51 (112)	48 (106)	53 (117)					
	JIS B2220	5K	385 (15.2)	12	23 (0.91)						345 (13.6)				
		7.5K	410 (16.1)	8											

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)			
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug				
			D	N	Y	P	L	F	G	H	A	Integral FEW411/FEW431	Remote	Integral FEW451	
DN 100 (4 in)	EN 1092	PN 10, 16	235 (9.3)	8	19 (0.75)	180 (7.1)	250 (9.9)	202 (8.0)	193 (7.6)	352 (13.9)	N/A	27 (60)	26 (58)	29 (64)	
		PN 25			23 (0.91)	190 (7.5)									
	ASME B16.5	CL150	215 (8.5)	4	19 (0.75)	191 (7.5)	212 (8.3)	203 (8.0)	362 (14.3)	23 (51)	20 (44)	25 (56)			
	AS 2129	Table E			18 (0.71)	178 (7.0)									
	AS 4087	PN 16	18 (0.71)	178 (7.0)	JIS B2220	5K	200 (7.9)	8	165 (6.5)	23 (51)	20 (44)	25 (56)			
	7.5K	238 (9.4)	4	19 (0.75)		195 (7.7)									
	10K	210 (8.3)	8	175 (6.9)											
DN 125 (5 in)	EN 1092	PN 10, 16	270 (10.6)	8	18 (0.71)	210 (8.3)	250 (9.9)	221 (8.7)	212 (8.3)	371 (14.6)	N/A	30 (66)	29 (64)	32 (71)	
		PN 25			28 (1.10)	220 (8.7)									
	ASME B16.5	CL150	255 (10.0)	18 (0.71)	210 (8.3)	212 (8.3)	203 (8.0)	362 (14.3)	26 (57)	23 (51)	28 (62)				
	AS 2129	Table E										22 (0.87)	216 (8.5)		
	JIS B2220	5K	235 (9.3)	19 (0.75)	200 (7.9)	23 (0.91)	210 (8.3)								
DN 150 (6 in)	EN 1092	PN 10, 16	300 (11.8)	8	23 (0.91)	240 (9.5)	300 (11.8)	233 (9.2)	224 (8.8)	383 (15.1)	10.2 (0.40)	35 (77)	34 (75)	37 (82)	
		PN 25			22 (0.87)	242 (9.5)									
	ASME B16.5	CL150	280 (11.0)	6	26 (1.02)	250 (9.8)	223 (8.8)	33 (73)	31 (68)	35 (78)					
	EN 1092	PN 25			22 (0.87)	250 (9.8)									
	AS 2129	Table E	18 (0.71)	235 (9.3)	JIS B2220	5K	265 (10.4)	19 (0.75)	230 (9.1)						
	AS 4087	PN 16	18 (0.71)	235 (9.3)		7.5K	290 (11.4)	8	247 (9.7)						
	10K	280 (11.0)	8	23 (0.91)		240 (9.5)									
DN 200 (8 in)	EN 1092	PN 10	370 (14.6)	8	23 (0.91)	295 (11.6)	350 (13.8)	259 (10.2)	409 (16.1)	10.2 (0.40)	68 (150)	67 (147)	70 (155)		
		PN 16												28 (1.10)	310 (12.2)
		PN 25												22 (0.87)	298 (11.7)
	ASME B16.5	CL150	335 (13.2)	8	22 (0.87)	292 (11.5)	258 (10.2)	408 (16.1)	51 (112)	48 (106)	53 (117)				
	AS 2129	Table E			18 (0.71)	292 (11.5)									
	AS 4087	PN 16	23 (0.91)	280 (11.0)	JIS B2220	5K	320 (12.6)	19 (0.75)	299 (11.8)						
	7.5K	342 (8.7)	8	23 (0.91)		290 (11.4)									
10K	330 (13.0)	12	23 (0.91)	290 (11.4)											
DN 250 (10 in)	EN 1092	PN10	395 (15.6)	12	22 (0.87)	350 (0.87)	450 (17.7)	285 (11.2)	276 (10.9)	435 (17.1)	10.2 (0.40)	78 (172)	75 (165)	80 (177)	
		PN16	405 (15.9)		26 (1.02)	355 (14.0)									
		PN25	425 (16.7)		30 (1.18)	370 (14.6)									
	AS 2129	Table E	405 (15.9)	8	22 (0.87)	356 (14.0)	25 (0.98)	355 (14.0)							
	AS 4087	PN 16	23 (0.91)		345 (13.6)										
	JIS B2220	5K	385 (15.2)	12	23 (0.91)	360 (14.2)			ASME B16.5	CL150	406 (16.0)	12	22 (0.87)	362 (14.3)	
		7.5K	410 (16.1)	8	25 (0.98)	355 (14.0)									
		10K	400 (15.8)	12	25 (0.98)	355 (14.0)									
DN 300 (12 in)	EN 1092	PN10	445 (17.5)	12	22 (0.87)	400 (15.8)	500 (19.7)	310 (12.2)	301 (11.9)	460 (18.1)	10.2 (0.40)	115 (253)	112 (247)	117 (258)	
		PN16	460 (18.1)		26 (1.02)	410 (16.1)									
		PN25	485 (19.1)		30 (1.18)	430 (16.9)									
	AS 2129	Table E	455 (17.9)	12	26 (1.02)	406 (16.0)	23 (0.91)	390 (15.4)							
	AS 4087	PN 16	22 (0.87)		414 (16.3)										
	JIS B2220	5K	430 (16.9)	12	23 (0.91)	390 (15.4)			ASME B16.5	CL150	483 (19.0)	12	22 (0.87)	432 (17.0)	
		7.5K	464 (18.3)	10	25 (0.98)	400 (15.8)									
		10K	445 (17.5)	16	25 (0.98)	400 (15.8)									

R-style sensor – DN 350 to DN 600 (14 to 24 in)

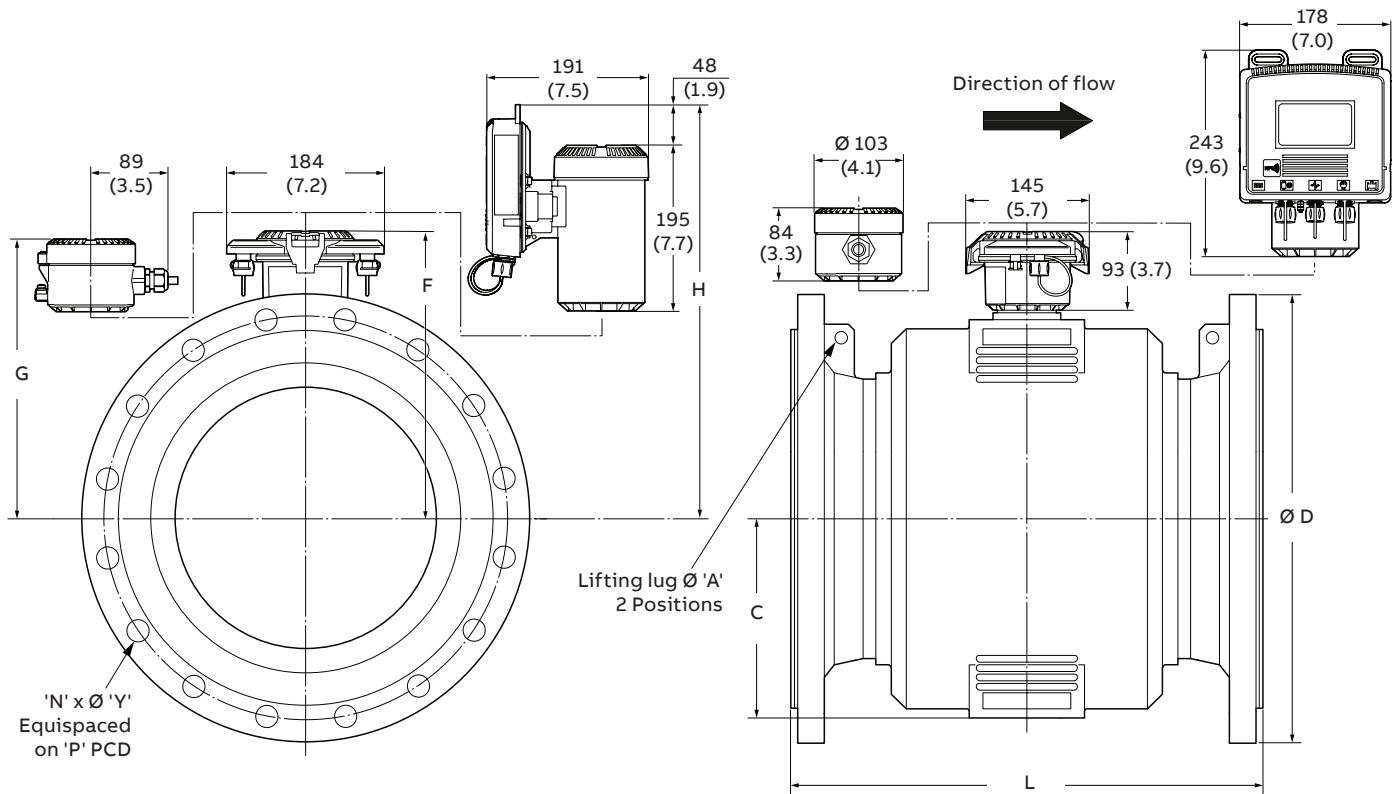


Figure 4 R-style sensor – DN 350 to DN 600 (14 to 24 in)

...R-style sensor – DN 350 to DN 600 (14 to 24 in)

Sensor size	Flange		Dimensions in mm (in)										Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. Holes	Bolt hole dia	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug	Cover flat			
			D	N	Y	P	L	F	G	H	A	C	Integral FEW411/FEW431	Remote	Integral FEW451
DN 350 (14 in)	EN 1092	PN 10	505 (19.9)	16	22 (0.87)	460 (18.1)	550 (21.7)	334 (13.2)	324 (12.8)	484 (19.1)	14.5 (0.57)	231 (9.1)	102 (225)	100 (220)	104 (230)
		PN 16	520 (20.5)		26 (1.02)	470 (18.5)									
		PN 25	555 (21.9)		33 (1.30)	490 (19.3)									
	ASME B16.5	CL150	535 (21.1)	12	29.5 (1.16)	476 (18.8)									
	AS 2129	Table E	525 (20.7)		26 (1.02)	470 (18.5)									
	AS 4087	PN 16													
	JIS B2220	5K	480 (18.9)	10	25 (0.98)	472 (18.6)									
		7.5K	530 (20.7)		472 (18.6)										
10K		490 (19.3)	16		445 (17.5)										
DN 400 (16 in)	EN 1092	PN 10	565 (22.3)	16	26 (1.02)	515 (20.3)	600 (23.6)	360 (14.2)	354 (13.9)	510 (20.1)	14.5 (0.57)	257 (10.1)	117 (258)	115 (254)	119 (263)
		PN 16	580 (22.8)		30 (1.18)	525 (20.7)									
		PN 25	620 (24.4)		36 (1.42)	550 (21.7)									
	ASME B16.5	CL150	600 (23.6)	12	29.5 (1.16)	540 (21.3)									
	AS 2129	Table E	580 (22.8)		26 (1.02)	521 (20.5)									
	AS 4087	PN 16													
	JIS B2220	5K	540 (21.3)	16	25 (0.98)	495 (19.5)									
		7.5K	582 (22.9)		12	524 (20.6)									
10K		560 (22.1)	16		27 (1.06)	510 (20.1)									
DN 450 (18 in)	EN 1092	PN 10	615 (24.2)	20	26 (1.02)	565 (22.3)	700 (27.6)	388 (15.3)	379 (14.9)	538 (21.2)	14.5 (0.57)	285 (11.2)	162 (357)	160 (353)	164 (362)
		PN 16	640 (25.2)		30 (1.18)	585 (23.0)									
		PN 25	670 (26.4)		36 (1.42)	600 (23.6)									
	ASME B16.5	CL150	635 (25.0)	16	32.5 (1.28)	578 (22.8)									
	AS 2129	Table E	640 (25.2)		26 (1.02)	584 (23.0)									
	AS 4087	PN 16													
	JIS B2220	5K	605 (23.8)	16	25 (0.98)	555 (21.9)									
		7.5K	652 (25.7)		12	585 (23.0)									
10K		620 (24.4)	20		27 (1.06)	565 (22.3)									
DN 500 (20 in)	EN 1092	PN 10	670 (26.4)	20	26 (1.02)	620 (24.4)	770 (30.3)	419 (16.5)	410 (16.2)	569 (22.4)	14.5 (0.57)	316 (12.5)	219 (483)	217 (477)	221 (488)
		PN 16	715 (28.2)		33 (1.30)	650 (25.6)									
		PN 25	730 (28.7)		36 (1.42)	660 (26.0)									
	ASME B16.5	CL150	700 (27.6)	16	32.5 (1.28)	635 (25.0)									
	AS 2129	Table E	705 (27.8)		26 (1.02)	641 (25.2)									
	AS 4087	PN 16													
	JIS B2220	5K	655 (25.8)	20	25 (0.98)	605 (23.8)									
		7.5K	706 (27.8)		12	639 (25.2)									
10K		675 (26.6)	20		27 (1.06)	620 (24.4)									
DN 600 (24 in)	EN 1092	PN 10	780 (30.7)	20	30 (1.18)	725 (28.6)	920 (36.2)	446 (17.6)	437 (17.2)	596 (23.5)	14.5 (0.57)	343 (13.5)	317 (699)	315 (695)	319 (704)
		PN 16	840 (33.1)		36 (1.42)	770 (30.3)									
		PN 25	845 (33.3)		39 (1.54)										
	ASME B16.5	CL150	815 (32.1)	16	35.5 (1.40)	749.5 (29.5)									
	AS 2129	Table E	825 (32.5)		33 (1.30)	756 (29.7)									
	AS 4087	PN 16													
	JIS B2220	5K	770 (30.3)	20	27 (1.06)	715 (28.2)									
		7.5K	810 (31.9)		16	743 (29.3)									
10K		795 (31.3)	24		33 (1.30)	730 (28.7)									

Sensor size	Flange		Dimensions in mm (in)										Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. Holes	Bolt hole dia	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug	Cover flat			
			D	N	Y	P	L	F	G	H	A	C	Integral FEW411/FEW431	Remote	Integral FEW451
DN 350 (14 in)	EN 1092	PN 10	505 (19.9)	16	22 (0.87)	460 (18.1)	550 (21.7)	334 (13.2)	324 (12.8)	484 (19.1)	14.5 (0.57)	231 (9.1)	102 (225)	100 (220)	104 (230)
		PN 16	520 (20.5)		26 (1.02)	470 (18.5)									
		PN 25	555 (21.9)		33 (1.30)	490 (19.3)									
	ASME B16.5	CL150	535 (21.1)	12	29.5 (1.16)	476 (18.8)									
	AS 2129	Table E	525 (20.7)		26 (1.02)	470 (18.5)									
	AS 4087	PN 16													
	JIS B2220	5K	480 (18.9)	10	25 (0.98)	472 (18.6)									
		7.5K	530 (20.7)		472 (18.6)										
10K		490 (19.3)	16		445 (17.5)										
DN 400 (16 in)	EN 1092	PN 10	565 (22.3)	16	26 (1.02)	515 (20.3)	600 (23.6)	360 (14.2)	354 (13.9)	510 (20.1)	14.5 (0.57)	257 (10.1)	117 (258)	115 (254)	119 (263)
		PN 16	580 (22.8)		30 (1.18)	525 (20.7)									
		PN 25	620 (24.4)		36 (1.42)	550 (21.7)									
	ASME B16.5	CL150	600 (23.6)	12	29.5 (1.16)	540 (21.3)									
	AS 2129	Table E	580 (22.8)		26 (1.02)	521 (20.5)									
	AS 4087	PN 16													
	JIS B2220	5K	540 (21.3)	16	25 (0.98)	495 (19.5)									
		7.5K	582 (22.9)		12	524 (20.6)									
10K		560 (22.1)	16		27 (1.06)	510 (20.1)									
DN 450 (18 in)	EN 1092	PN 10	615 (24.2)	20	26 (1.02)	565 (22.3)	700 (27.6)	388 (15.3)	379 (14.9)	538 (21.2)	14.5 (0.57)	285 (11.2)	162 (357)	160 (353)	164 (362)
		PN 16	640 (25.2)		30 (1.18)	585 (23.0)									
		PN 25	670 (26.4)		36 (1.42)	600 (23.6)									
	ASME B16.5	CL150	635 (25.0)	16	32.5 (1.28)	578 (22.8)									
	AS 2129	Table E	640 (25.2)		26 (1.02)	584 (23.0)									
	AS 4087	PN 16													
	JIS B2220	5K	605 (23.8)	16	25 (0.98)	555 (21.9)									
		7.5K	652 (25.7)		12	585 (23.0)									
10K		620 (24.4)	20		27 (1.06)	565 (22.3)									
DN 500 (20 in)	EN 1092	PN 10	670 (26.4)	20	26 (1.02)	620 (24.4)	770 (30.3)	419 (16.5)	410 (16.2)	569 (22.4)	14.5 (0.57)	316 (12.5)	219 (483)	217 (477)	221 (488)
		PN 16	715 (28.2)		33 (1.30)	650 (25.6)									
		PN 25	730 (28.7)		36 (1.42)	660 (26.0)									
	ASME B16.5	CL150	700 (27.6)	16	32.5 (1.28)	635 (25.0)									
	AS 2129	Table E	705 (27.8)		26 (1.02)	641 (25.2)									
	AS 4087	PN 16													
	JIS B2220	5K	655 (25.8)	20	25 (0.98)	605 (23.8)									
		7.5K	706 (27.8)		12	639 (25.2)									
10K		675 (26.6)	20		27 (1.06)	620 (24.4)									
DN 600 (24 in)	EN 1092	PN 10	780 (30.7)	20	30 (1.18)	725 (28.6)	920 (36.2)	446 (17.6)	437 (17.2)	596 (23.5)	14.5 (0.57)	343 (13.5)	317 (699)	315 (695)	319 (704)
		PN 16	840 (33.1)		36 (1.42)	770 (30.3)									
		PN 25	845 (33.3)		39 (1.54)										
	ASME B16.5	CL150	815 (32.1)	16	35.5 (1.40)	749.5 (29.5)									
	AS 2129	Table E	825 (32.5)		33 (1.30)	756 (29.7)									
	AS 4087	PN 16													
	JIS B2220	5K	770 (30.3)	20	27 (1.06)	715 (28.2)									
		7.5K	810 (31.9)		16	743 (29.3)									
10K		795 (31.3)	24		33 (1.30)	730 (28.7)									

V-style sensor – DN 40 to DN 200 (1½ to 8 in)

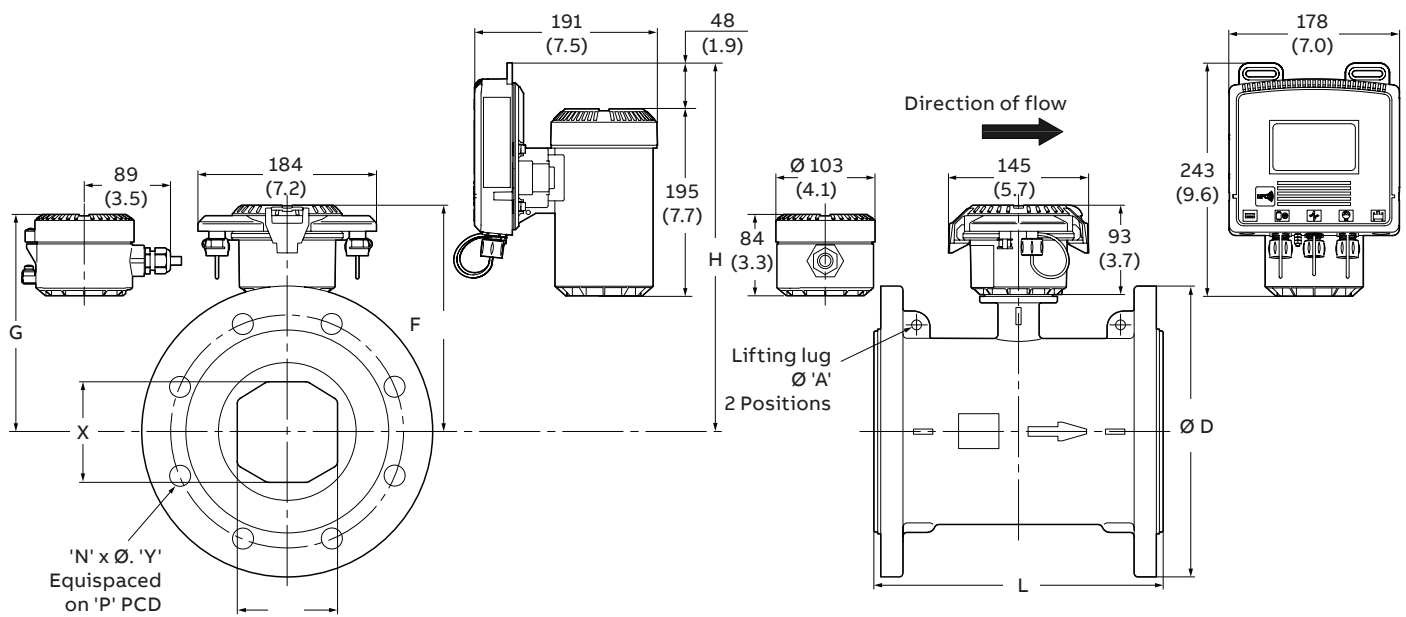
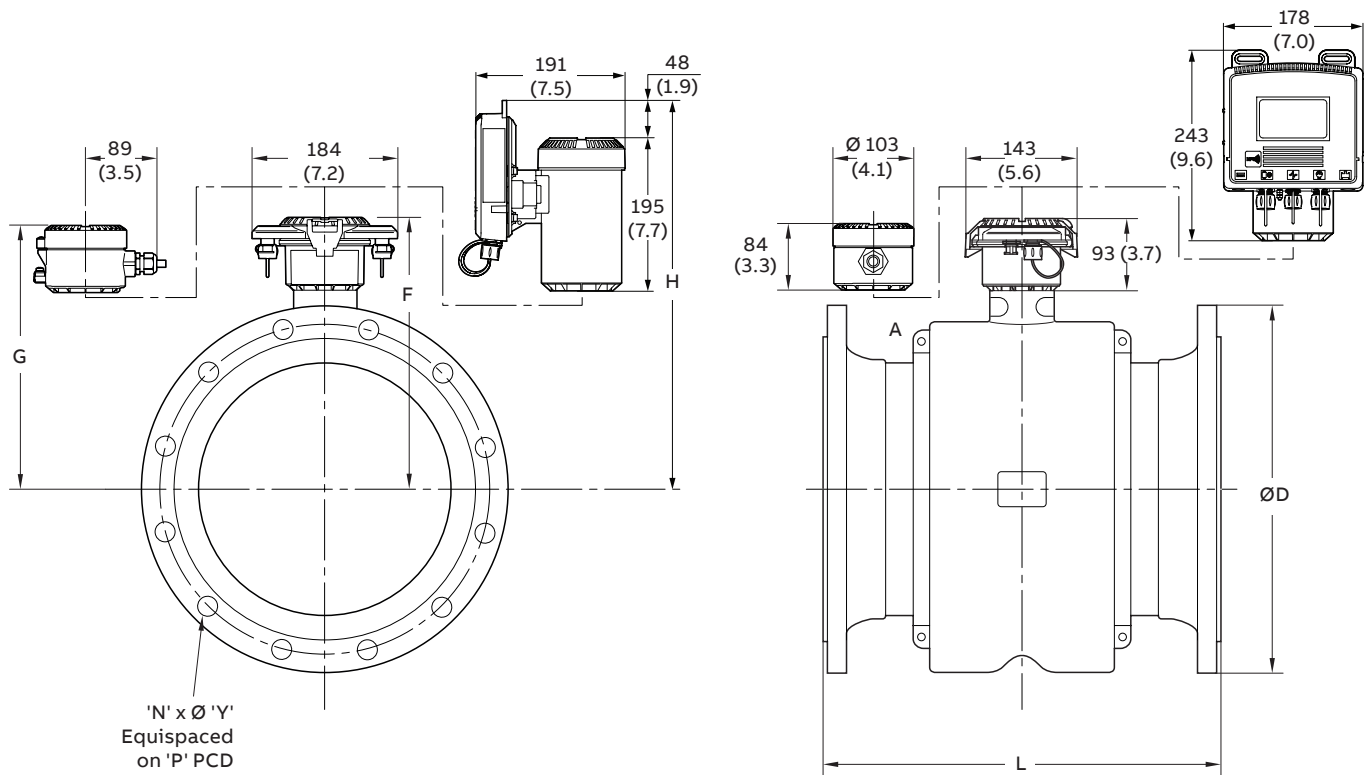


Figure 5 V-style sensor – DN 40 to DN 200 (1½ to 8 in)

...V-style sensor – DN 40 to DN 200 (1½ to 8 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug	Integral		
			D	N	Y	P	L	F	G	H	A	FEW411	Remote	Integral FEW451
DN 40 (1½ in)	EN 1092	PN 10, 16, 25	150 (5.9)	4	19 (0.75)	110 (4.3)	200 (7.9)	158 (6.2)	149 (5.9)	308 (12.1)	N/A	13 (29)	12 (27)	15 (33)
	ASME B16.5	CL150			15.7 (0.62)	98 (3.9)								
	AS 2129	Table E			14 (0.55)	105 (4.2)								
	JIS B2220	10K			19 (0.75)	105 (4.2)								
DN 50 (2 in)	EN 1092	PN 10, 16, 25	165 (6.5)	4	19 (0.75)	125 (4.9)	200 (7.9)	162 (6.4)	153 (6.0)	312 (12.3)	N/A	14 (31)	13 (29)	16 (36)
	ASME B16.5	CL150			121 (4.8)	114 (4.5)								
	AS 2129	Table E			18 (0.71)	114 (4.5)								
	AS 4087	PN 16			19 (0.75)	120 (4.7)								
DN 65 (2½ in)	EN 1092	PN 10, 16	185 (7.3)	4	19 (0.75)	145 (5.7)	200 (7.9)	176 (6.9)	167 (6.6)	326 (12.9)	N/A	16 (35)	15 (33)	18 (40)
	ASME B16.5	PN 25		8	20 (0.79)	140 (5.5)								
	AS 2129	Table E		4	18 (0.71)	127 (5.0)								
	AS 4087	PN 16		19 (0.75)	140 (5.5)									
DN 80 (3 in)	EN 1092	PN 10, 16, 25	200 (7.9)	8	19 (0.75)	160 (6.3)	200 (7.9)	181 (7.1)	172 (6.8)	331 (13.1)	N/A	17 (38)	16 (36)	19 (42)
	ASME B16.5	CL150		20 (0.79)	152 (6.0)									
	AS 2129	Table E		4	18 (0.71)	146 (5.8)								
	AS 4087	PN 16		8	19 (0.75)	150 (5.9)								
DN 100 (4 in)	EN 1092	PN 10, 16	235 (9.3)	8	19 (0.75)	180 (0.71)	250 (9.9)	202 (8.0)	193 (7.6)	352 (13.9)	N/A	19 (42)	18 (40)	21 (47)
	ASME B16.5	PN 25			23 (0.91)	190 (7.5)								
	AS 2129	Table E			19 (0.75)	191 (7.5)								
	AS 4087	PN 16			18 (0.71)	178 (7.0)								
DN 125 (5 in)	EN 1092	PN 10, 16	270 (10.6)	8	18 (0.71)	210 (8.3)	250 (9.9)	221 (8.7)	212 (8.3)	371 (14.6)	N/A	30 (66)	29 (64)	32 (71)
	ASME B16.5	PN 25			28 (1.10)	220 (8.7)								
	AS 2129	Table E			22 (0.87)	216 (8.5)								
	JIS B2220	10K			18 (0.71)	210 (8.3)								
DN 150 (6 in)	EN 1092	PN10, 16	300 (11.8)	8	23 (0.91)	240 (9.5)	300 (11.8)	233 (9.2)	224 (8.8)	383 (15.1)	10.2 (0.40)	35 (77)	34 (75)	37 (82)
	ASME B16.5	CL150			22 (0.87)	242 (9.5)								
	EN 1092	PN 25			26 (1.02)	250 (9.8)								
	AS 2129	Table E			22 (0.87)	235 (9.3)								
DN 200 (8 in)	EN 1092	PN10	370 (14.6)	8	23 (0.91)	295 (11.6)	350 (13.8)	259 (10.2)	249 (9.8)	409 (16.1)	10.2 (0.40)	67 (147)	66 (145)	69 (153)
	ASME B16.5	PN16			28 (1.10)	310 (12.2)								
	AS 2129	CL150			22 (0.87)	298 (11.7)								
	AS 4087	Table E			18 (0.71)	292 (11.5)								

F-style sensor – DN 250 to DN 400 (10 to 16 in)**Figure 6 F-style sensor – DN 250 to DN 400 (10 to 16 in)**

...Dimensions – sensors

...F-style sensor – DN 250 to DN 400 (10 to 16 in)

Table 5 F-style sensor – DN 250 to DN 400 (10 to 16 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)			
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug	Integral FEW411/ FEW431	Remote	Integral FEW451	
			D	N	Y	P	L	F	G	H	A				
DN250 (10 in)	EN 1092 or DIN	PN10	395 (15.55)	12	22 (0.87)	350 (13.78)	450 (17.72)	319 (12.56)	310 (12.20)	469 (18.46)	N/A	61 (134)	59 (130)	63 (139)	
		PN16	405 (15.94)		26 (1.02)	355 (13.98)						65 (143)	63 (139)	67 (148)	
		PN25	425 (16.73)		30 (1.18)	370 (14.57)						84 (185)	82 (181)	86 (190)	
		PN40	450 (17.72)		33 (1.30)	385 (15.16)						95 (209)	93 (205)	97 (214)	
	AS4087	PN16	405 (15.94)	8	22 (0.87)	356 (14.02)						65 (143)	63 (139)	67 (148)	
		PN35	430 (16.93)		26 (1.02)	381 (15.00)						95 (209)	93 (205)	97 (214)	
	JIS B2220	5K	385 (15.16)	12	23 (0.91)	345 (13.58)						65 (143)	63 (139)	67 (148)	
		10K	400 (15.75)		25 (0.98)	355 (13.98)									
	ASME B16.5	CL300	445 (17.52)	16	29 (1.13)	387 (15.25)						105 (231)	103 (227)	107 (236)	
		CL150	405 (15.94)		12	26 (1.02)						362 (14.25)	70 (154)	68 (150)	72 (159)
DN300 (12 in)	EN 1092 or DIN	PN10	445 (17.52)	12	22 (0.87)	400 (15.75)	500 (19.69)	342 (13.46)	333 (13.11)	492 (19.37)	N/A	74 (163)	72 (159)	76 (168)	
		PN16	460 (18.11)		26 (1.02)	410 (16.14)						80 (176)	78 (172)	82 (181)	
		PN25	485 (19.09)		30 (1.18)	430 (16.93)						100 (220)	98 (216)	102 (225)	
		PN40	515 (20.28)		33 (1.30)	450 (17.72)						130 (287)	128 (282)	132 (291)	
	JIS B2220	5K	430 (16.93)	12	23 (0.91)	390 (15.35)						80 (176)	78 (172)	82 (181)	
		10K	445 (17.52)		16	25 (0.98)						400 (15.75)			
	AS4087	PN16	455 (17.91)	12	22 (0.87)	406 (15.98)	500 (19.69)					130 (287)	128 (282)	132 (291)	
		PN35	490 (19.29)		26	26 (1.02)						438 (17.24)	150 (331)	148 (326)	152 (336)
	ASME B16.5	CL300	520 (20.47)	16	32 (1.25)	451 (17.75)						105 (231)	103 (227)	107 (236)	
		CL150	485 (19.09)		12	26 (1.02)						432 (17.00)			
DN350 (14 in)	EN 1092 or DIN	PN10	505 (19.88)	16	22 (0.87)	460 (18.11)		550 (21.65)	357 (14.06)	348 (13.70)	507 (19.96)	N/A	95 (209)	93 (205)	97 (214)
		PN16	520 (20.47)		26 (1.02)	470 (18.50)							110 (243)	108 (238)	112 (247)
		PN25	555 (21.85)		33 (1.30)	490 (19.29)	145 (320)						143 (315)	147 (324)	
		PN40	580 (22.83)		36 (1.42)	510 (20.08)	195 (430)						193 (425)	197 (435)	
	JIS B2220	5K	480 (18.90)	12	22 (0.87)	435 (17.13)	95 (209)						93 (205)	97 (214)	
		10K	490 (19.29)		16	25 (0.98)	445 (17.52)								
	AS4087	PN16	525 (20.67)	12	26 (1.02)	470 (18.50)	550 (21.65)	130 (287)					128 (282)	132 (291)	
		PN35	550 (21.65)		16	30 (1.18)		495 (19.49)					185 (408)	183 (403)	187 (412)
	ASME B16.5	CL300	585 (23.03)	20	32 (1.25)	514(20.25)		140 (309)					138 (304)	142 (314)	
		CL150	535 (21.06)		12	29 (1.14)		476 (18.75)					105 (231)	103 (227)	107 (236)
DN400 (16 in)	EN 1092 or DIN	PN10	565 (22.24)	16	26 (1.02)	515 (20.28)		600 (23.62)	399 (15.71)	390 (15.35)	549 (21.61)	N/A	103 (227)	101 (223)	105 (232)
		PN16	580 (22.83)		30 (1.18)	525 (20.67)							126 (278)	124 (273)	128 (283)
		PN25	620 (24.41)		36 (1.42)	550 (21.65)	170 (375)						168 (370)	172 (380)	
		PN40	660 (25.98)		39 (1.54)	585 (23.03)	258 (569)						256 (564)	260 (574)	
	JIS B2220	5K	540 (21.26)	12	25 (0.98)	495 (19.49)	103 (227)						101 (223)	105 (232)	
		10K	560 (22.05)		16	27 (1.06)	510 (20.08)						116 (256)	114 (251)	118 (261)
	AS4087	PN16	580 (22.83)	12	26 (1.02)	521 (20.51)	600 (23.62)	154 (340)					152 (335)	156 (344)	
		PN35	610 (24.02)		20	30 (1.18)		552 (21.73)					302 (666)	300 (661)	304 (670)
	ASME B16.5	CL300	650 (25.59)	24	35 (1.38)	572 (22.50)		265 (584)					263 (580)	267 (589)	
		CL150	600 (23.62)		12	29 (1.14)		540 (21.25)					175 (386)	173 (381)	177 (391)

...Dimensions – sensors

...F-style sensor – DN 450 to DN 600 (18 to 24 in)

Table 6 F-style sensor – DN 450 to DN 600 (18 to 24 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug	Integral FEW411/FEW431	Remote	Integral FEW451
			D	N	Y	P	L	F	G	H	A			
DN450 (18 in)	EN 1092 or DIN	PN10	615 (24.21)	20	26 (1.02)	565 (22.24)	600	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	173 (381)	171 (377)	175 (386)
		PN16	640 (25.20)		30 (1.18)	585 (23.03)	(23.62)					188 (414)	186 (410)	190 (419)
		PN25	670 (26.38)		36 (1.42)	600 (23.62)	686					245 (540)	243 (536)	247 (545)
		PN40	685 (26.97)		39 (1.54)	610 (24.02)	(27.01)					315 (694)	313 (690)	317 (699)
	JIS B2220	5K	605 (23.82)	16	25 (0.98)	555 (21.85)	600 (23.62)	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	165 (364)	163 (359)	167 (369)
		10K	620 (24.41)	20	27 (1.06)	565 (22.24)						177 (390)	175 (386)	179 (395)
	AS4087	PN16	640 (25.20)	12	26 (1.02)	584 (22.99)	600 (23.62)	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	232 (511)	230 (507)	234 (516)
		PN35	675 (26.57)	20	33 (1.30)	610 (24.02)						328 (723)	326 (719)	330 (728)
	ASME B16.5	CL300	710 (27.95)	24	35 (1.38)	629 (24.75)	762 (30.00)	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	368 (811)	366 (807)	370 (816)
		CL150	635 (25.00)	16	32 (1.26)	578 (22.75)						250 (551)	248 (547)	252 (556)
DN500 (20 in)	EN 1092 or DIN	PN10	670 (26.38)	20	26 (1.02)	620 (24.41)	600	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	190 (419)	188 (414)	192 (424)
		PN16	715 (28.15)		33 (1.30)	650 (25.59)	(23.62)					240 (529)	238 (525)	242 (534)
		PN25	730 (28.74)		36 (1.42)	660 (25.98)	700 (27.56)					300 (661)	298 (657)	302 (666)
		PN40	755 (29.72)		42 (1.65)	670 (26.38)	762 (30.00)					392 (864)	390 (860)	394 (869)
	JIS B2220	5K	655 (25.79)	16	25 (0.98)	605 (23.82)	600 (23.62)	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	190 (419)	188 (414)	192 (424)
		10K	675 (26.57)		27 (1.06)	620 (24.41)						290 (639)	288 (635)	292 (644)
	AS4087	PN16	705 (27.76)	24	33 (1.30)	673 (26.50)	762 (30.00)	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	435 (959)	433 (955)	437 (964)
		PN35	735 (28.94)	20	32 (1.26)	635 (25.00)						300 (661)	298 (657)	302 (666)
	ASME B16.5	CL150	700 (27.56)	24	35 (1.38)	659 (25.94)	762 (30.00)	407 (16.02)	398 (15.67)	557 (21.93)	30 (1.18)	490 (1080)	488 (1076)	492 (1085)
		CL300	775 (30.51)	16	32 (1.26)	578 (22.75)						250 (551)	248 (547)	252 (556)
DN600 (24 in)	EN 1092 or DIN	PN10	780 (30.71)	20	30 (1.18)	725 (28.54)	800	458 (18.03)	449 (17.68)	608 (23.94)	30 (1.18)	284 (626)	282 (622)	286 (631)
		PN16	840 (33.07)		36 (1.42)	770 (30.31)	(31.50)					318 (701)	316 (697)	320 (706)
		PN25	845 (33.27)		39 (1.54)	770 (30.31)	890					460 (1014)	458 (1010)	462 (1019)
		PN40	890 (35.04)		26 (1.02)	705 (27.76)	(35.04)					600 (1323)	598 (1318)	602 (1328)
	JIS B2220	5K	770 (30.31)	24	27 (1.06)	715 (28.15)	800 (31.50)	458 (18.03)	449 (17.68)	608 (23.94)	30 (1.18)	275 (606)	273 (602)	277 (611)
		10K	795 (31.30)		33 (1.30)	730 (28.74)						306 (675)	304 (670)	308 (679)
	AS4087	PN16	825 (32.48)	16	30 (1.18)	756 (29.76)	800 (31.50)	458 (18.03)	449 (17.68)	608 (23.94)	30 (1.18)	382 (842)	380 (838)	384 (847)
		PN35	850 (33.46)	24	36 (1.42)	781 (30.75)						452 (996)	450 (992)	454 (1001)
	ASME B16.5	CL300	915 (36.02)	24	41 (1.61)	813 (32.00)	800 (31.50)	458 (18.03)	449 (17.68)	608 (23.94)	30 (1.18)	550 (1213)	548 (1208)	552 (1217)
		CL150	815 (32.09)	20	35 (1.38)	750 (29.50)						425 (937)	423 (933)	427 (942)

F-style sensor – DN 700 to DN 2400 (28 to 96 in)

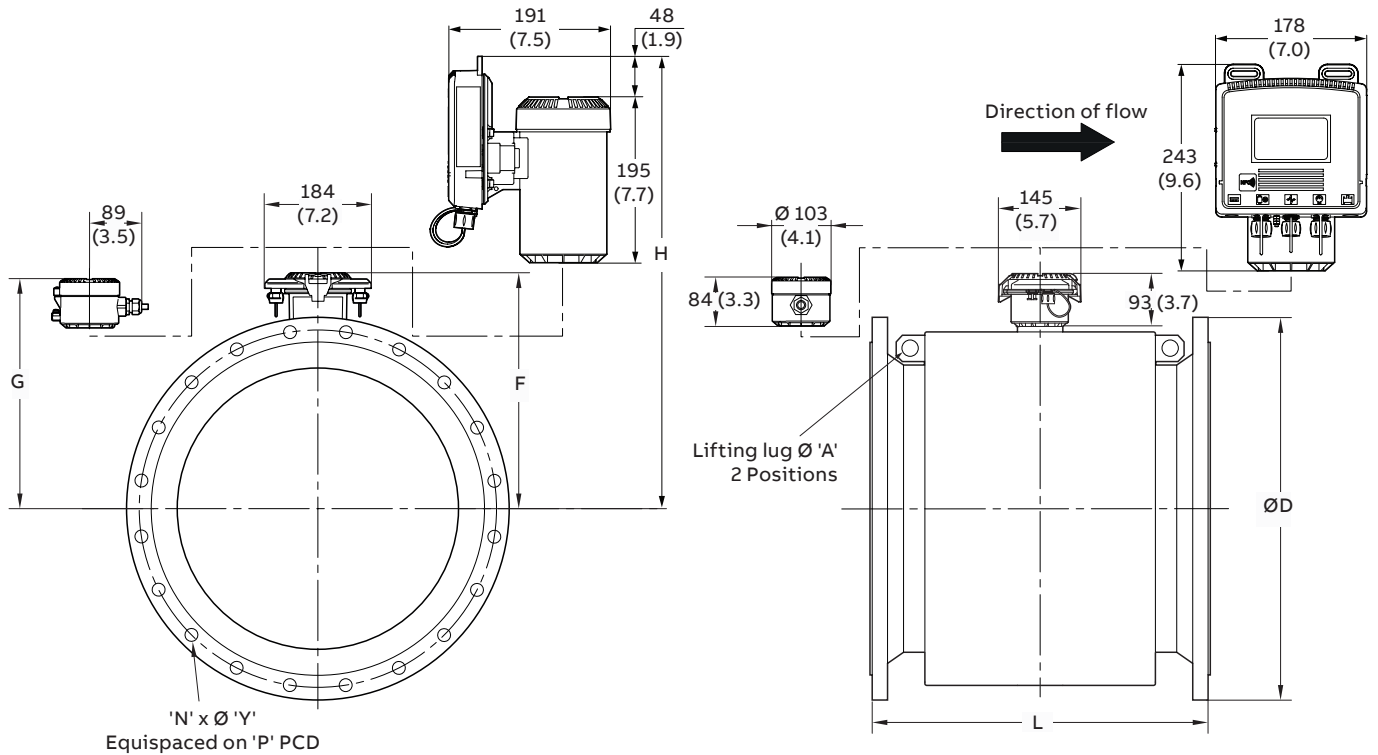


Figure 8 F-style sensor – DN 700 to DN 2400 (28 to 96 in)

Table 7 F-style sensor – DN 700 (28 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	Tx. height	Lifting lug	Integral FEW411/FEW431	Remote	Integral FEW451
			D	N	Y	P	L	F	G	H	A			
DN700 (28 in)	JIS	5K	875 (34.45)		27 (1.06)	820 (32.28)						213 (470)	211 (466)	215 (474)
		10K	905 (35.63)		33 (1.30)	840 (33.07)						251 (554)	249 (549)	253 (558)
		PN6	860 (33.86)		26 (1.02)	810 (31.89)	700 (27.56)					187 (413)	185 (408)	189 (417)
	EN 1092 or DIN	PN10	895 (35.24)	24	30 (1.18)	840 (33.07)						235 (519)	233 (514)	237 (523)
		PN16	910 (35.83)		36 (1.42)	840 (33.07)						270 (596)	268 (591)	272 (600)
		PN25	960 (37.80)		42 (1.65)	875 (34.45)	800 (31.50)					419 (924)	417 (920)	421 (929)
		PN40	995 (39.17)		48 (1.89)	900 (35.43)	910 (35.83)					632 (1394)	630 (1389)	634 (1398)
	AWWA C207	CLASS B	927 (36.50)		32 (1.26)	864 (34.02)	700 (27.56)					247 (545)	245 (541)	249 (549)
		CLASS D	927 (36.50)		32 (1.26)	864 (34.02)	700 (27.56)					270 (596)	268 (591)	272 (600)
		CLASS E	927 (36.50)	28	32 (1.26)	864 (34.02)		497 (19.57)	492 (19.37)	647 (25.47)	30 (1.18)	434 (957)	432 (953)	436 (962)
		CLASS F	1035 (40.75)		44 (1.73)	940 (37.01)	762 (30.00)					674 (1486)	672 (1482)	676 (1491)
	AS 4087	PN16	910 (35.83)	20	30 (1.18)	845 (33.27)	700 (27.56)					356 (785)	354 (781)	358 (790)
		PN35	935 (36.81)	24	36 (1.42)	857 (33.74)	910 (35.83)					584 (1288)	582 (1284)	586 (1292)
	AS 2129	TABLE D	910 (35.83)	20	30 (1.18)	845 (33.27)	910 (35.83)					308 (680)	306 (675)	310 (684)
		TABLE E			33 (1.30)		700 (27.56)					274 (605)	272 (600)	276 (609)
	ASME B16.5	CL150 SERIES A	925 (36.42)	28	35 (1.38)	864 (34.00)	790 (31.10)					454 (1001)	452 (997)	456 (1006)
		CL150 SERIES B	835 (32.87)	40	22 (0.87)	795 (31.31)	910 (35.83)					368 (812)	366 (807)	370 (816)
	ASME B16.5	CL300 SERIES A	1035 (40.75)	28	45 (1.75)	940 (37.00)	940 (37.01)					1002 (2210)	1000 (2205)	1004 (2214)
		CL300 SERIES B	920 (36.22)	36	35 (1.38)	857 (33.75)	910 (35.83)					680 (1500)	678 (1495)	682 (1504)

...Dimensions – sensors

...F-style sensor – DN 700 to DN 2400 (28 to 96 in)

Table 8 F-style sensor – DN 750 to DN 900 (30 to 36 in)

Sensor size	Flange		Dimensions in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Tx. height	T. box height	T. box height	Lifting lug	Integral FEW411/ FEW431	Remote	Integral FEW451
			D	N	Y	P	L	F	G	H	A			
DN750 (30 in)	JIS	JIS5K	945 (37.20)	24	33 (1.30)	880 (34.65)						245 (541)	243 (536)	247 (545)
		JIS10K	970 (38.19)			900 (35.43)						317 (699)	315 (695)	319 (704)
	AWWA C207	CLASS B	984 (38.74)	28	32 (1.26)	914 (35.98)	762 (30.00)					268 (591)	266 (587)	270 (596)
		CLASS D	984 (38.74)									322 (710)	320 (706)	324 (715)
		CLASS E	984 (38.74)									472 (1041)	470 (1037)	474 (1045)
		CLASS F	1092 (42.99)									755 (1665)	753 (1661)	757 (1669)
	AS 4087	PN16	995 (39.17)	20	33 (1.30)	927 (36.50)	990 (38.98)	523 (20.59)	518 (20.39)	673 (26.5)	30 (1.18)	410 (904)	408 (900)	412 (909)
		PN35	1015 (39.96)	28	36 (1.42)	940 (37.01)						713 (1572)	711 (1568)	715 (1577)
	AS 2129	TABLE D	995 (39.17)	20	33 (1.30)	927 (36.50)	990 (38.98)					390 (860)	388 (856)	392 (865)
		TABLE E	995 (39.17)		36 (1.42)		762 (30.00)					350 (772)	348 (768)	352 (777)
	ASME B16.5	CL150 SERIES A	985 (38.78)	28	35 (1.38)	914 (36.00)	830 (32.67)					505 (1114)	503 (1109)	507 (1118)
		CL150 SERIES B	885 (34.84)	44	22 (0.87)	846 (33.31)	990 (38.98)					368 (812)	366 (807)	370 (816)
DN800 (32 in)	JIS	JIS5K	995 (39.17)	24	33 (1.30)	930 (36.61)	800 (31.50)					280 (618)	278 (613)	282 (622)
		JIS10K	1020 (40.16)	28	33 (1.30)	950 (37.40)						328 (724)	326 (719)	330 (728)
	EN 1092 or DIN	PN6	975 (38.39)	24	30 (1.18)	920 (36.22)	800 (31.50)					239 (527)	237 (523)	241 (532)
		PN10	1015 (39.96)	34	33 (1.30)	950 (37.40)						312 (688)	310 (684)	314 (693)
		PN16	1025 (40.35)	24	39 (1.54)	950 (37.40)						366 (807)	364 (803)	368 (812)
		PN25	1085 (42.72)		48 (1.89)	990 (38.98)						599 (1321)	597 (1317)	601 (1325)
	AWWA C207	PN40	1140 (44.88)	28	56 (2.20)	1030 (40.55)	1040 (40.94)	547 (21.54)	542 (21.34)	697 (27.44)	30 (1.18)	919 (2027)	917 (2022)	921 (2031)
		CLASS B	1060 (41.73)		38 (1.50)	978 (38.50)	800 (31.50)					334 (737)	332 (732)	336 (741)
		CLASS D	1060 (41.73)		38 (1.50)	978 (38.50)	880 (34.65)					394 (869)	392 (865)	396 (874)
		CLASS E	1060 (41.73)		44 (1.73)	1054 (41.50)	880 (34.65)					591 (1303)	589 (1299)	593 (1308)
	AS 4087	PN16	1060 (41.73)	20	36 (1.42)	984 (38.74)	800 (31.50)					886 (1954)	884 (1949)	888 (1958)
		PN35	1060 (41.73)	28			1040 (40.94)					482 (1063)	480 (1059)	484 (1068)
	AS2129	TABLE D	1060 (41.73)	20	36 (1.42)	984 (38.74)	1040 (40.94)					802 (1769)	800 (1764)	804 (1773)
		TABLE E	1060 (41.73)				800 (31.50)					440 (971)	438 (966)	442 (975)
DN900 (36 in)	JIS	JIS5K	1095 (43.11)	24	33 (1.30)	1030 (40.55)	900 (35.43)					347 (766)	345 (761)	349 (770)
		JIS10K	1120 (44.09)	28	33 (1.30)	1050 (41.34)						419 (924)	417 (920)	421 (929)
	EN 1092 or DIN	PN6	1075 (42.32)	24	30 (1.18)	1020 (40.16)	900 (35.43)					300 (662)	298 (657)	302 (666)
		PN10	1115 (43.90)	28	33 (1.30)	1050 (41.34)						396 (874)	394 (869)	398 (878)
		PN16	1125 (44.29)		39 (1.54)	1050 (41.34)						485 (1070)	483 (1065)	487 (1074)
		PN25	1185 (46.65)		48 (1.89)	1090 (42.91)						757 (1669)	755 (1665)	759 (1674)
	AWWA C207	PN40	1250 (49.21)	32	56 (2.20)	1140 (44.88)	1170 (46.06)	598 (23.54)	593 (23.35)	748 (29.45)	30 (1.18)	1219 (2688)	1217 (2684)	1221 (2692)
		CLASS B										397 (876)	395 (871)	399 (880)
		CLASS D	1168 (45.98)		38 (1.50)	1086 (42.76)						436 (962)	434 (957)	438 (966)
		CLASS E					900 (35.43)					744 (1641)	742 (1636)	746 (1645)
	AS 4087	PN16	1175 (46.26)	24	36 (1.42)	1092 (42.99)	1170 (46.06)					1064 (2346)	1062 (2342)	1066 (2351)
		PN35	1185 (46.65)	32	39 (1.54)	1105 (43.50)						686 (1513)	684 (1508)	688 (1517)
	AS 2129	TABLE D	1175 (46.26)	24	36 (1.42)	1092 (42.99)	1170 (46.06)					1103 (2432)	1101 (2428)	1105 (2437)
		TABLE E					900 (35.43)					574 (1266)	572 (1262)	576 (1270)
ASME B16.5	CL150 SERIES A	CL150 SERIES A	1170 (46.06)	32	41.3 (1.63)	1086 (42.75)	1120 (44.09)					574 (1266)	572 (1262)	576 (1270)
		CL150 SERIES B	1055 (41.54)	44	25.4 (1.00)	1010 (39.75)	1170 (46.06)					580 (1279)	578 (1275)	582 (1284)
	ASME B16.5	CL300 SERIES A	1270 (50.00)	32	54 (2.13)	1168 (46.00)	1180 (46.46)					933 (2057)	931 (2053)	935 (2062)
		CL300 SERIES B	1170 (46.06)		44.5 (1.75)	1089 (42.87)	1170 (46.06)					655 (1445)	653 (1440)	657 (1449)
ASME B16.5	CL150 SERIES A	CL150 SERIES A	1170 (46.06)	32	41.3 (1.63)	1086 (42.75)	1120 (44.09)					1533 (3380)	1531 (3376)	1535 (3385)
		CL150 SERIES B	1055 (41.54)		25.4 (1.00)	1010 (39.75)	1170 (46.06)					1206 (2659)	1204 (2655)	1208 (2664)
	ASME B16.5	CL300 SERIES A	1270 (50.00)	32	54 (2.13)	1168 (46.00)	1180 (46.46)					1533 (3380)	1531 (3376)	1535 (3385)
		CL300 SERIES B	1170 (46.06)		44.5 (1.75)	1089 (42.87)	1170 (46.06)					1206 (2659)	1204 (2655)	1208 (2664)

...F-style sensor – DN 700 to DN 2400 (28 to 96 in)

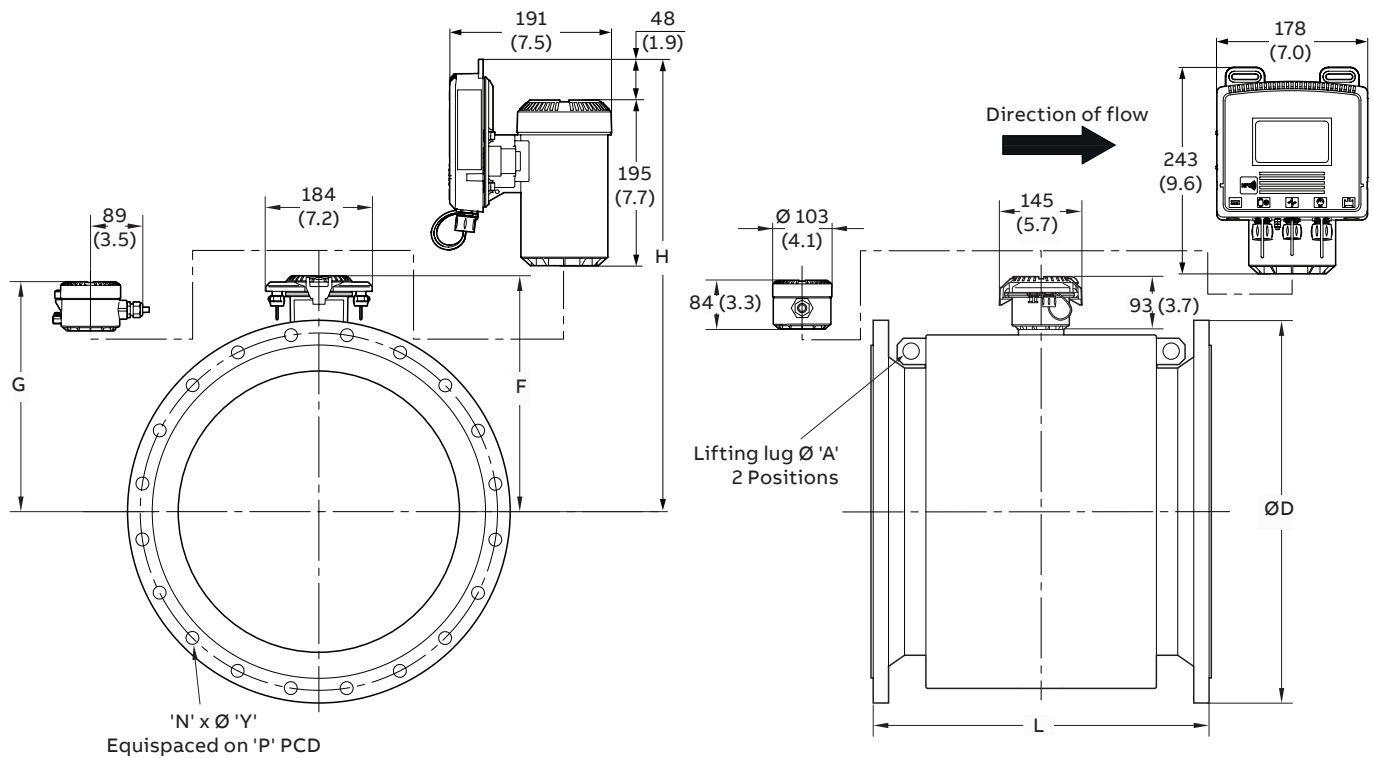


Figure 9 F-style sensor – DN 700 to DN 2400 (28 to 96 in)

Table 9 F-style sensor – DN 1000 (40 in)

Sensor size	Flange		Dimensional in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Trans height	Tx. box height	Tx. box height	Lifting lug	Integral FEW411/FEW431	Remote	Integral FEW451
			D	N	Y	P	L	F	G	H	A			
DN1000 (40 in)	JIS	JIS5K	1195 (47.05)		33 (1.30)	1130 (44.49)						407 (898)	405 (893)	409 (902)
		JIS10K	1235 (48.62)		39 (1.54)	1160 (45.67)						505 (1114)	503 (1109)	507 (1118)
	EN 1092 or DIN	PN6	1175 (46.26)		30 (1.18)	1120 (44.09)	1000 (39.37)					348 (768)	346 (763)	350 (772)
		PN10	1230 (48.43)	28	36 (1.42)	1160 (45.67)						469 (1034)	467 (1030)	471 (1039)
		PN16	1255 (49.41)		42 (1.65)	1170 (46.06)						613 (1352)	611 (1348)	615 (1356)
		PN25	1320 (51.97)			1210 (47.64)	1170 (46.06)					1004 (2214)	1002 (2210)	1006 (2218)
		PN40	1360 (53.54)		56 (2.20)	1250 (49.21)	1300 (51.18)					1486 (3277)	1484 (3272)	1488 (3281)
		CLASS B	1289 (50.75)									474 (1045)	472 (1041)	476 (1050)
	AWWA C207	CLASS D	1289 (50.75)	36	38 (1.50)	1200 (47.24)						618 (1363)	616 (1359)	620 (1367)
		CLASS E	1289 (50.75)				1000 (39.37)	648 (25.51)	643 (25.31)	798 (31.42)	30 (1.18)	922 (2033)	920 (2029)	924 (2038)
		CLASS F	1378 (54.25)		51 (2.01)	1276 (50.24)						1300 (2867)	1298 (2862)	1302 (2871)
		PN16	1255 (49.41)	24	36 (1.42)	1175 (46.26)						740 (1632)	738 (1628)	742 (1636)
	AS 4087	PN35	1275 (50.20)	36	39 (1.54)	1194 (47.01)	1300 (51.18)					1316 (2902)	1314 (2897)	1318 (2906)
		TABLE D	1255 (49.41)	24	36 (1.42)		1300 (51.18)					682 (1504)	680 (1500)	684 (1508)
	AS 2129	TABLE E	1255 (49.41)		39 (1.54)	1175 (46.26)	1000 (39.37)					652 (1438)	650 (1434)	654 (1442)
		CL150 SERIES A	1290 (50.79)	36	41 (1.63)	1200 (47.25)	1090 (42.91)					1034 (2280)	1032 (2276)	1036 (2284)
	ASME B16.5	CL150 SERIES B	1175 (46.26)	44	29 (1.13)	1121 (44.13)	1300 (51.18)					809 (1784)	807 (1780)	811 (1788)
		CL300 SERIES A	1240 (48.82)	32	45 (1.75)	1156 (45.50)	1150 (45.28)					1287 (2838)	1285 (2833)	1289 (2842)
	ASME B16.5	CL300 SERIES B	1275 (50.20)	40		1191 (46.87)	1300 (51.18)					1560 (3440)	1558 (3435)	1562 (3444)

...Dimensions – sensors

...F-style sensor – DN 700 to DN 2400 (28 to 96 in)

Table 10 F-style sensor – DN 1050 to DN 1400 (42 to 56 in)

Sensor size	Flange		Dimensional in mm (in)									Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. holes	Bolt hole dia.	Bolt hole PCD	Sensor length	Trans height	Tx. height	Tx. height	Lifting lug	Integral FEW411/ FEW431	Remote	Integral FEW451
			D	N	Y	P	L	F	G	H	A			
DN1050 (42 in)	AWWA C207	CLASS B										559 (1233)	557 (1228)	561 (1237)
		CLASS D	1346 (52.99)		38 (1.50)	1257 (49.49)						614 (1354)	612 (1350)	616 (1359)
		CLASS E					1067 (42.01)					1102 (2430)	1100 (2426)	1104 (2434)
		CLASS F	1448 (57.01)	36	51 (2.01)	1340 (52.76)						1522 (3356)	1520 (3352)	1524 (3360)
	ASME B16.5	CL150 SERIES A	1345 (52.95)		41.3 (1.63)	1257 (49.50)		701 (27.6)	697 (27.44)	851 (33.5)	30 (1.18)	1200 (2646)	1198 (2642)	1202 (2650)
		CL150 SERIES B	1225 (48.23)	48	28.6 (1.13)	1172 (46.13)	1365 (53.74)					910 (2007)	908 (2002)	912 (2011)
	ASME B16.5	CL300 SERIES A	1290 (50.79)	32	44.5 (1.75)	1207 (47.50)	1170 (46.06)					1432 (3158)	1430 (3153)	1434 (3162)
		CL300 SERIES B	1335 (52.56)	36	47.6 (1.87)	1245 (49.00)	1365 (53.74)					1804 (3978)	1802 (3973)	1806 (3982)
DN1100 (44 in)	JIS	JIS5K	1305 (51.38)		33 (1.30)	1240 (48.82)						478 (1054)	476 (1050)	480 (1059)
		JIS10K	1345 (52.95)	28	39 (1.54)	1270 (50.00)						679 (1497)	677 (1493)	681 (1502)
	AWWA C207	CLASS B	1403 (55.24)		38 (1.50)	1315 (51.77)	1118 (44.02)	701 (27.60)	697 (27.44)	851 (33.5)	30 (1.18)	605 (1334)	603 (1330)	607 (1339)
		CLASS D	1403 (55.24)	40								695 (1533)	693 (1528)	697 (1537)
		CLASS E	1404 (55.28)	40	38 (1.50)							1132 (2496)	1130 (2492)	1134 (2501)
		CLASS F	1505 (59.25)	36	51 (2.01)	1397 (55.00)						1640 (3616)	1638 (3612)	1642 (3620)
DN1200 (48 in)	JIS	5K	1420 (55.91)		33 (1.30)	1350 (53.15)						653 (1440)	651 (1436)	655 (1445)
		10K	1465 (57.68)		39 (1.54)	1380 (54.33)						819 (1806)	817 (1802)	821 (1810)
		PN6	1405 (55.31)		33 (1.30)	1340 (52.76)	1200 (47.24)					538 (1187)	536 (1182)	540 (1191)
	EN 1092 or DIN	PN10	1455 (57.28)	32	39 (1.54)	1380 (54.33)						753 (1661)	751 (1656)	755 (1665)
		PN16	1485 (58.46)		48 (1.89)	1390 (54.72)						981 (2163)	979 (2159)	983 (2168)
		PN25	1530 (60.24)		56 (2.20)	1420 (55.91)						1654 (3647)	1652 (3643)	1656 (3651)
		PN40	1575 (62.01)		62 (2.44)	1460 (57.48)	1560 (61.42)					2229 (4915)	2227 (4910)	2231 (4919)
	AWWA C207	CLASS B	1511 (59.49)		38 (1.50)	1422 (55.98)						746 (1645)	744 (1641)	748 (1650)
		CLASS D	1511 (59.49)	44			1200 (47.24)	753 (29.65)	748 (29.49)	903 (35.55)	30 (1.18)	886 (1954)	884 (1949)	888 (1958)
		CLASS E	1511 (59.49)		38 (1.50)	1422 (55.98)						1389 (3063)	1387 (3058)	1391 (3067)
		CLASS F	1651 (65.00)	40	51 (2.01)	1543 (60.75)						2300 (5071)	2298 (5067)	2302 (5076)
	AS 4087	PN16	1490 (58.66)	32	36 (1.42)		1200 (47.24)					1207 (2661)	1205 (2657)	1209 (2666)
	AS 2129	TABLE-D	1490 (58.66)	32	36 (1.42)	1410 (55.51)	1560 (61.42)					1118 (2465)	1116 (2461)	1120 (2470)
		TABLE-E	1490 (58.66)	32	39 (1.54)		1200 (47.24)					1085 (2393)	1083 (2388)	1087 (2397)
	AS 4087	PN35	1530 (60.24)	40	42 (1.65)	1441 (56.73)	1560 (61.42)					2211 (4875)	2209 (4871)	2213 (4879)
	ASME CL150	SERIES A	1510 (59.45)		41 (1.63)	1422 (56.00)	1320 (51.97)					1612 (3554)	1610 (3550)	1614 (3559)
		SERIES B	1390 (54.72)	44	32 (1.25)	1335 (52.56)	1560 (61.42)					1178 (2598)	1176 (2593)	1180 (2602)
	ASME CL300	SERIES A	1465 (57.68)	32	51 (2.01)	1372 (54.00)	1400 (55.12)					2051 (4522)	2049 (4518)	2053 (4527)
		SERIES B	1510 (59.45)	40	51 (2.01)	1416 (55.75)	1560 (61.42)					2446 (5393)	2444 (5389)	2448 (5397)
DN1350 (54 in)	AWWA C207	CLASS B										942 (2077)	940 (2073)	944 (2082)
		CLASS D	1683 (66.26)	44	44 (1.73)	1594 (62.76)	1350 (53.15)	848 (33.39)	843 (33.19)	998 (39.29)	45 (1.77)	1026 (2262)	1024 (2258)	1028 (2267)
		CLASS E										1834 (4044)	1832 (4039)	1836 (4048)
DN1400 (56 in)	EN 1092 or DIN	PN6	1630 (64.17)		36 (1.42)	1560 (61.42)						774 (1707)	772 (1702)	776 (1711)
		PN10	1675 (65.94)		42 (1.65)		1400 (55.12)					1080 (2381)	1078 (2377)	1082 (2386)
		PN16	1685 (66.34)	36	48 (1.89)	1590 (62.60)						1293 (2851)	1291 (2847)	1295 (2855)
		PN25	1755 (69.09)		62 (2.44)	1640 (64.57)						2483 (5475)	2481 (5470)	2485 (5479)
		PN40	1795 (70.67)		62 (2.44)	1680 (66.14)	1820 (71.65)	848 (33.39)	843 (33.19)	998 (39.29)	45 (1.77)	3202 (7060)	3200 (7055)	3204 (7064)
	ASME CL150	SERIES A	1745 (68.70)	48	48 (1.87)	1651 (65.00)	1500 (59.06)					2365 (5214)	2363 (5210)	2367 (5219)
		SERIES B	1600 (62.99)	60	32 (1.25)	1543 (60.75)	1820 (71.65)					1706 (3762)	1704 (3757)	1708 (3766)
	ASME CL300	SERIES A	1710 (67.32)	28	60 (2.37)	1600 (63.00)	1600 (62.99)					3166 (6980)	3164 (6976)	3168 (6985)
		SERIES B	1765 (69.49)	36	60 (2.37)	1651 (65.00)	1820 (71.65)					3873 (8539)	3871 (8535)	3875 (8543)

...F-style sensor – DN 700 to DN 2400 (28 to 96 in)

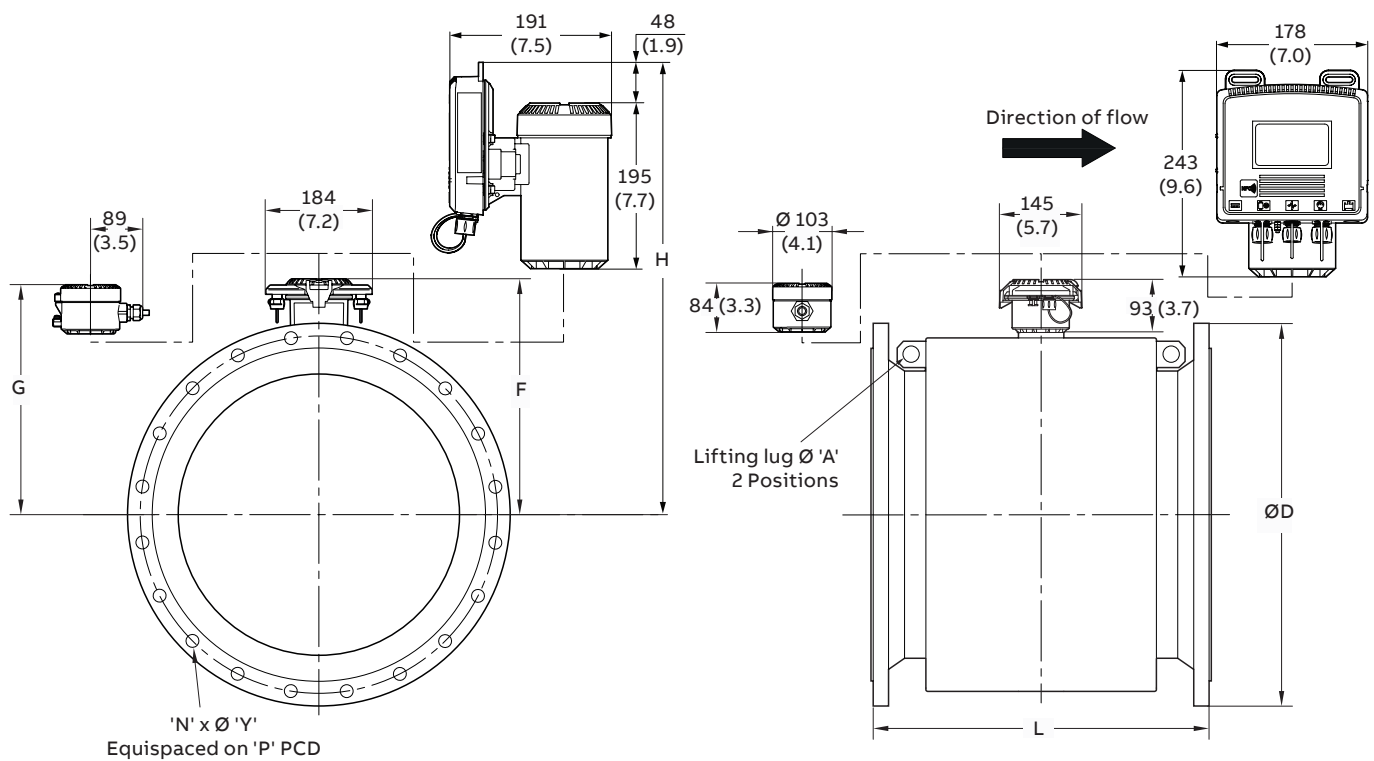


Figure 10 F-style sensor – DN 700 to DN 2400 (28 to 96 in)

...Dimensions – sensors

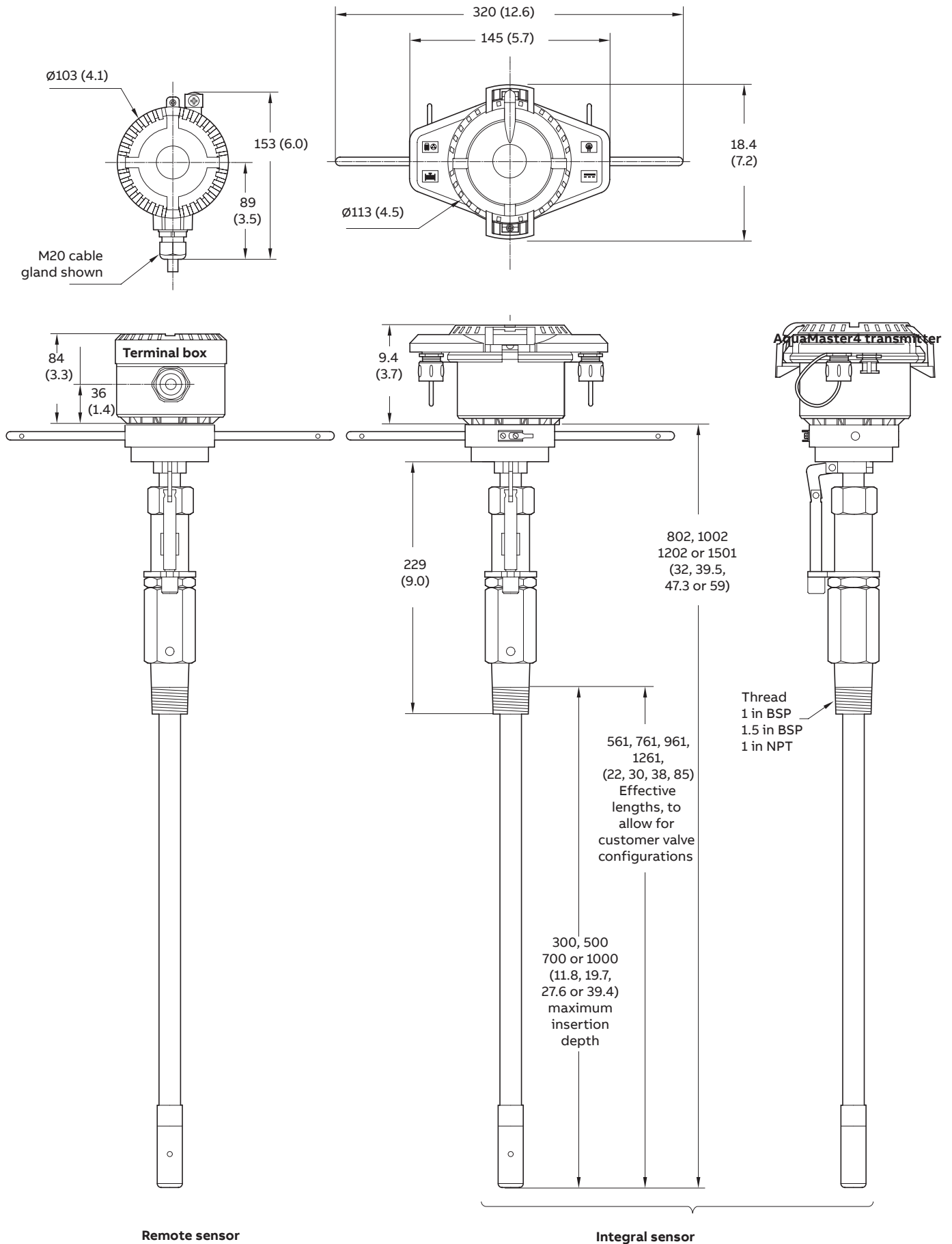
...F-style sensor – DN 700 to DN 2400 (28 to 96 in)

Table 11 F-style sensor – DN 1050 to DN 2400 (60 to 96 in)

Sensor size	Flange		Dimensional in mm (in)										Approx. weight kg (lbs)		
	Standard	Class	Flange OD	No. Holes	Bolt Hole Dia	Bolt Hole PCD	Sensor length	Trans Height	Tx. Height	Tx. Height	Lifting Lug	Integral FEW411/ FEW431	Remote	Integral FEW451	
			D	N	Y	P	L	F	G	H	A				
DN1500 (60 in)	JIS	5K	1730 (68.11)	36	33 (1.30)	1660 (65.35)						1137 (2507)	1135 (2503)	1139 (2512)	
		10K	1795 (70.67)	40	45 (1.77)	1700 (66.93)						1568 (3457)	1566 (3453)	1570 (3462)	
	AWWA C207	CLASS B	1854 (72.99)									1290 (2844)	1288 (2840)	1292 (2849)	
		CLASS D	1854 (72.99)		44 (1.73)		1524 (60.00)					1569 (3460)	1567 (3455)	1571 (3464)	
		CLASS E	1854 (72.99)			1759 (69.25)		958 (37.72)	953 (37.52)	1108 (43.62)	45 (1.77)	2497 (5505)	2495 (5501)	2499 (5510)	
				52	47.6 (1.87)							2847 (6277)	2845 (6273)	2849 (6281)	
	ASME CL150	SERIES A	1855 (73.03)									2031 (4478)	2029 (4474)	2033 (4482)	
					35 (1.38)	1662 (65.44)	1950 (76.77)					3717 (8195)	3715 (8191)	3719 (8199)	
	ASME CL300	SERIES A	1810 (71.26)	32	60 (2.37)	1702 (67.00)	1640 (64.57)					4181 (9218)	4179 (9214)	4183 (9222)	
		SERIES B	1880 (74.02)	40	60 (2.37)	1764 (69.44)	1950 (76.77)								
DN1600 (64 in)	EN 1092 or DIN	PN6	1830 (72.05)		36 (1.42)	1760 (69.29)						1033 (2278)	1031 (2273)	1035 (2282)	
		PN10	1915 (75.39)		48 (1.89)	1820 (71.65)	1600 (62.99)					1509 (3327)	1507 (3323)	1511 (3332)	
		PN16	1975 (77.76)	40	56 (2.20)	1820 (71.65)		959 (37.76)	954 (37.56)	1109 (43.66)	45 (1.77)	1955 (4311)	1953 (4306)	1957 (4315)	
		PN25	1930 (75.98)		62 (2.44)	1860 (73.23)	2080 (81.89)					3201 (7057)	3199 (7053)	3203 (7062)	
		PN40	2025 (79.72)		70 (2.76)	1900 (74.80)						4375 (9646)	4373 (9641)	4377 (9650)	
DN1650 (66 in)	AWWA C207	CLASS B	2032 (80.00)	52	44(1.75)	1930(75.98)	1650 (64.96)	1009 (39.72)	1004 (39.53)	1159 (45.63)	45 (1.77)	1497 (3301)	1495 (3296)	1499 (3305)	
		CLASS D	2032 (80.00)									1763 (3887)	1761 (3883)	1765 (3892)	
DN1800 (72 in)	EN 1092 or DIN	PN6	2045 (80.51)		39 (1.54)	1970 (77.56)						1356 (2990)	1354 (2986)	1358 (2994)	
		PN10	2115 (83.27)		48 (1.89)	2020 (79.53)	1800 (70.87)					1949 (4297)	1947 (4293)	1951 (4302)	
		PN16	2130 (83.86)	44	56 (2.20)	2020 (79.53)		1074 (42.28)	1069 (42.09)	1224 (48.19)	45 (1.77)	2524 (5565)	2522 (5561)	2526 (5569)	
		PN25	2195 (86.42)		70 (2.76)	2070 (81.50)	2340 (92.12)					4422 (9749)	4420 (9745)	4424 (9754)	
	AWWA C207	CLASS B										1833 (4042)	1831 (4037)	1835 (4046)	
		CLASS D	2197 (86.50)	60	44 (1.73)	2096 (82.52)	1800 (70.87)					2147 (4734)	2145 (4729)	2149 (4738)	
DN1950 (78 in)	AWWA C207	CLASS B						1184 (46.61)	1179 (46.42)	1334 (52.52)	45 (1.77)	2312 (5098)	2310 (5093)	2314 (5102)	
		CLASS D	2362 (92.99)	64	51(2.01)	2261(89.02)	1950 (76.77)					2684 (5918)	2682 (5913)	2686 (5922)	
DN2000 (80 in)	EN 1092 or DIN	PN6	2265 (89.17)		42 (1.65)	2180 (85.83)						1781 (3927)	1779 (3923)	1783 (3931)	
		PN10	2325 (91.54)		48 (1.89)	2230 (87.80)	2000 (78.74)					2580 (5688)	2578 (5684)	2582 (5693)	
		PN16	2345 (92.32)	48	62 (2.44)	2230 (87.80)		1184 (46.61)	1179 (46.42)	1334 (52.52)	45 (1.77)	3230 (7121)	3228 (7117)	3232 (7126)	
							2600 (102.36)					5896 (12999)	5894 (12995)	5898 (13003)	
		PN25	2425 (95.47)		70 (2.76)	2300 (90.55)									
DN2100 (84 in)	AWWA C207	CLASS B						1288 (50.71)	1283 (50.51)	1438 (56.61)	45 (1.77)	2570 (5666)	2568 (5662)	2572 (5671)	
		CLASS D	2534 (99.76)	64	51(2.01)	2426 (95.51)	2100 (82.68)					2942 (6486)	2940 (6482)	2944 (6491)	
DN2200 (88 in)	EN 1092 or DIN	PN6	2475 (97.44)		42 (1.65)	2390 (94.09)						2446 (5393)	2444 (5389)	2448 (5397)	
		PN10	2550 (100.39)	52	56 (2.20)	2440 (96.06)	2200 (86.61)	1288 (50.71)	1283 (50.51)	1438 (56.61)	45 (1.77)	3202 (7060)	3200 (7055)	3204 (7064)	
DN2400 (96 in)	EN 1092 or DIN	PN6	2685 (105.71)		42 (1.65)	2600 (102.36)						2846 (6275)	2844 (6270)	2848 (6279)	
		PN10	2760 (108.66)	56	56 (2.20)	2650 (104.33)	2400 (94.49)	1388 (54.65)	1283 (50.51)	1538 (60.55)	45 (1.77)	4111 (9064)	4109 (9059)	4113 (9068)	

Table 12 F-style sensor – DN 1500 to DN 2400 (42 to 96 in)

Dimensions – insertion flowmeter

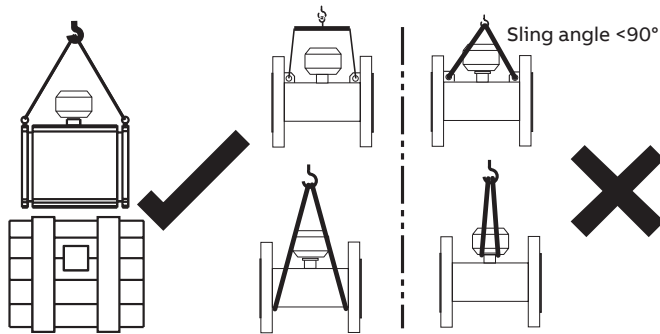


Installation requirements – sensor

This section is intended to give an overview of installation of a flowmeter. For Installation requirements, technical information and Health and Safety precautions refer to User Guide [OI/FER100/FER200-EN](#).

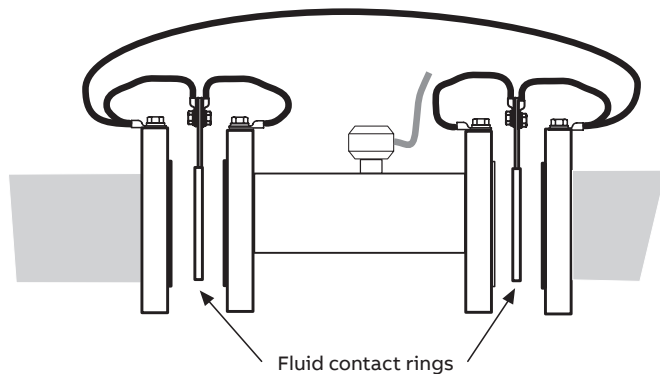
Unpacking the flowmeter

Care must be taken when lifting the flowmeter to use the lifting hooks provided or sling under the body of the meter. Never lift the flowmeter using the terminal connection box of the sensor cable as this causes damage and invalidates the warranty.

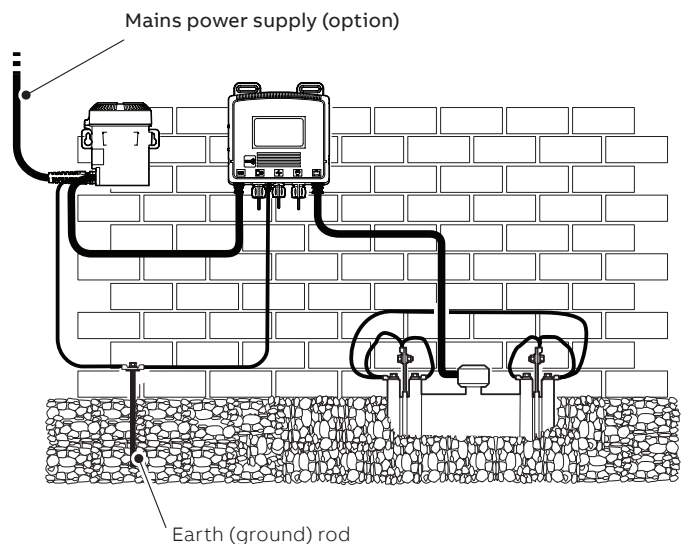
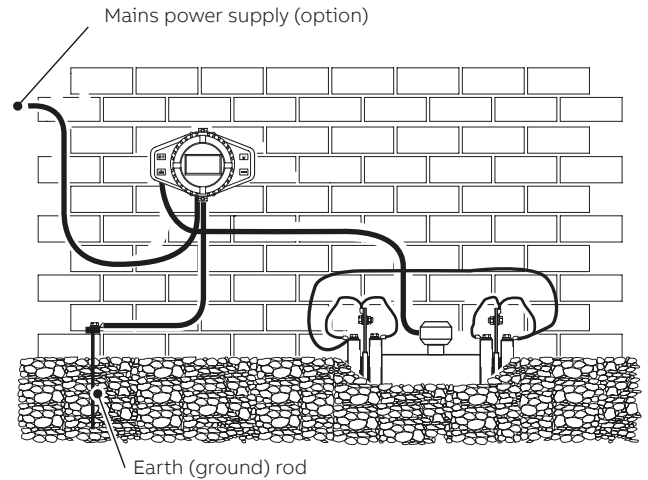


Grounding

The flowmeter sensor must be cross-bonded to the upstream and downstream pipes. For technical reasons, this potential must be identical to the potential of the metering fluid. The fluid connection is made by installing 2 fluid contact rings (for grounding).

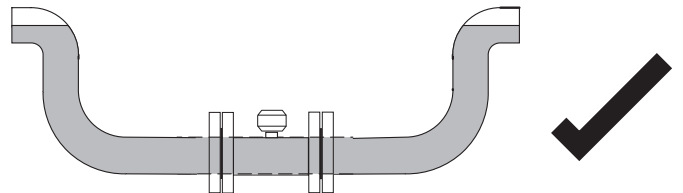


Note. The grounding arrangements shown below are applicable to both cathodic and non-cathodic protected installations.



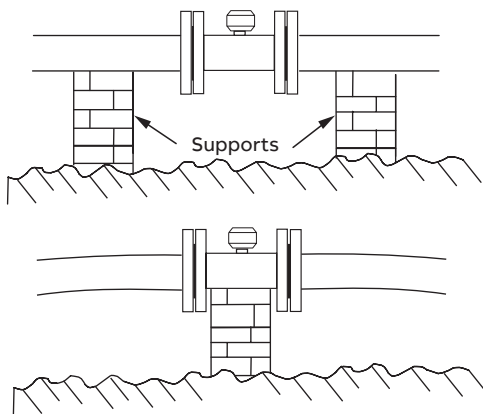
Mounting

The installation conditions shown below must be observed to achieve the best operational results. The sensor tube must always be completely full.

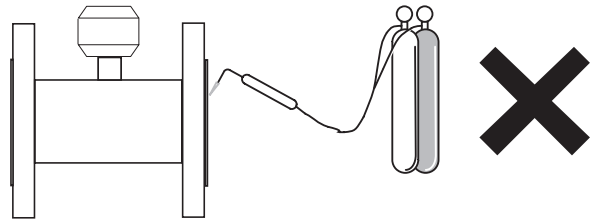


The flow direction must correspond to the identification plate. The flowmeter measures the flowrate in both directions. Forward flow is the factory setting.

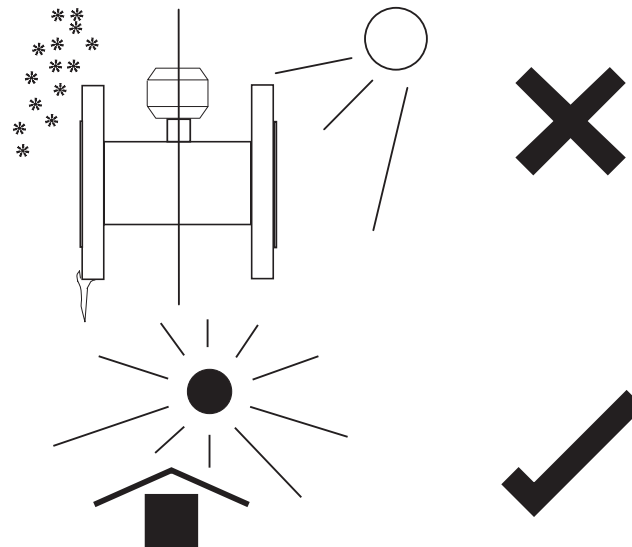
The flowmeter must be installed without mechanical tension (torsion, bending). If necessary, support the pipeline.



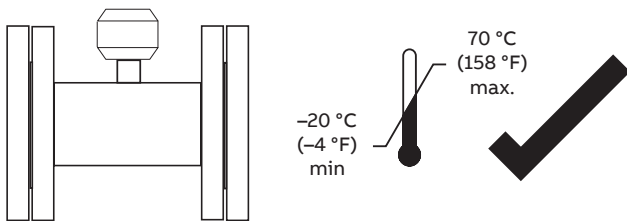
The flowmeter must not be submitted to localized heating during installation; take care to remember this is a measuring instrument.



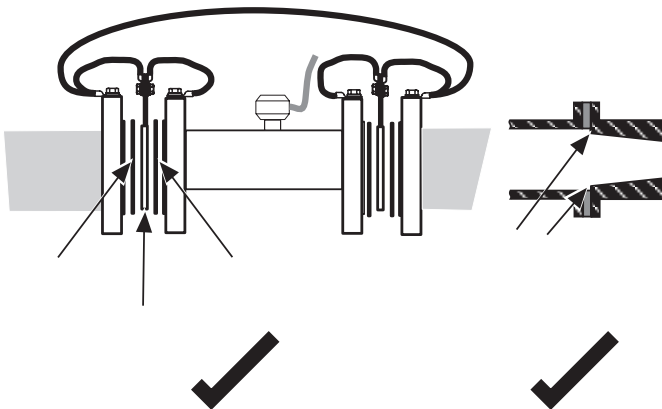
The flowmeter must not be exposed to direct sunlight. Provide appropriate sun protection where necessary.



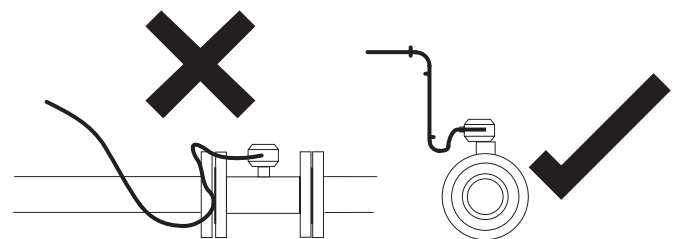
The flange seal material must be compatible with the fluid and fluid temperatures.



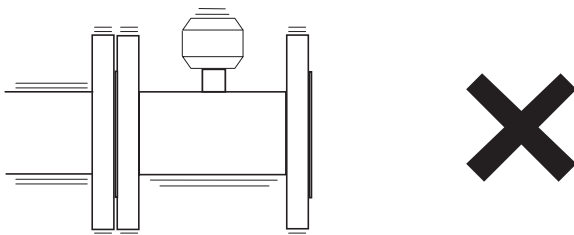
Seals must not extend into the flow area as this causes turbulence that adversely influences flowmeter accuracy.



The cable to the flowmeter must be installed neatly or within a conduit. Both loose or conduit installations must have a u-bend below terminal connection box height to enable any water to run off thus avoiding any capillary action into the flowmeter sensor.

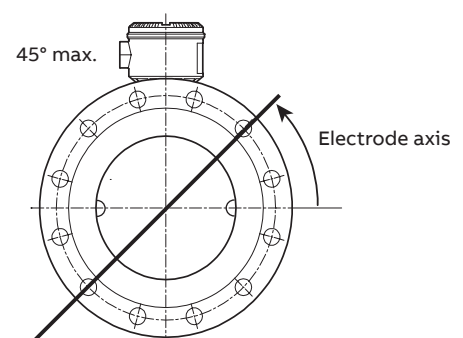


The pipeline must not exert any forces and torques on the flowmeter (for example, vibration).



Electrode axis

The electrode axis must be horizontal wherever possible or no more than 45° from horizontal.



Installation requirements – transmitter (41X/43X)

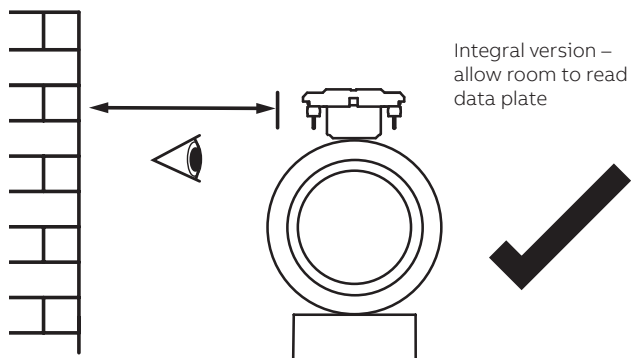


Figure 11 Siting

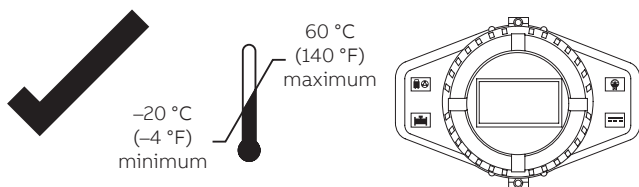


Figure 12 Within temperature limits

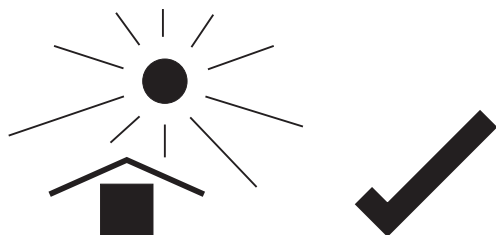


Figure 13 Shade

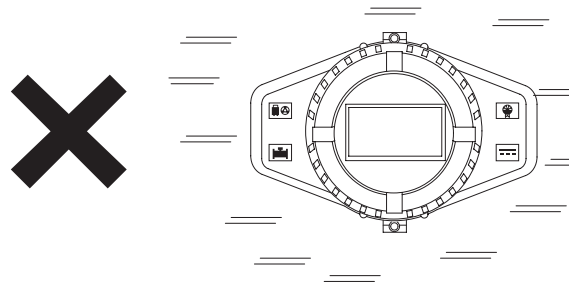


Figure 14 Vibration

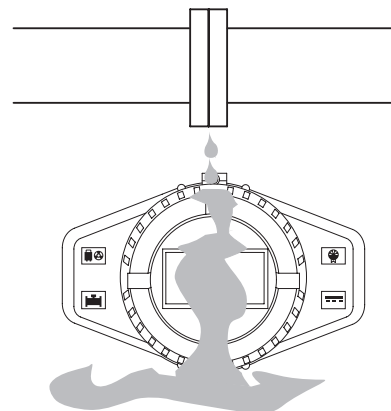


Figure 15 Spillage

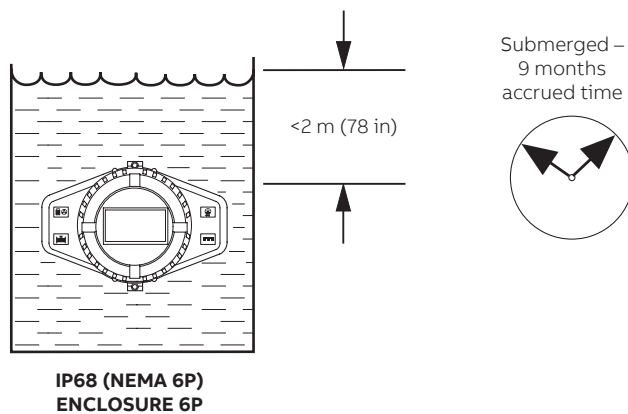


Figure 16 Within environmental rating

Installation conditions – FET 450

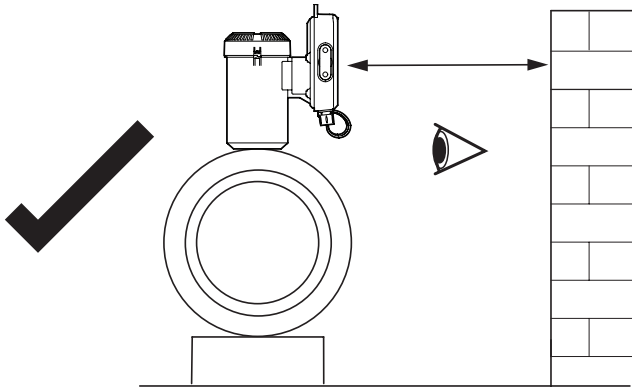


Figure 17 Siting

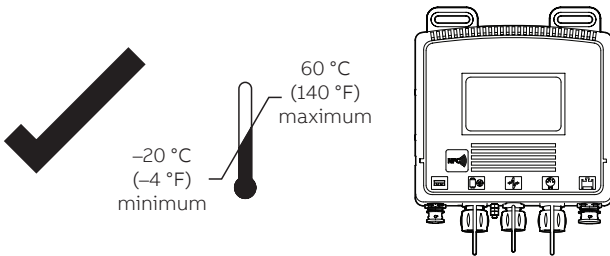


Figure 18 Within temperature limits

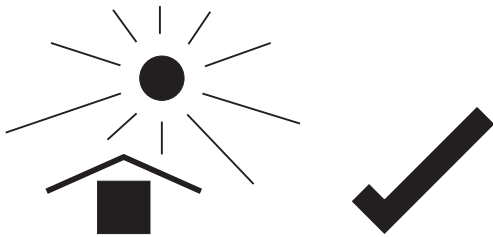


Figure 19 Shade



Figure 20 Vibration

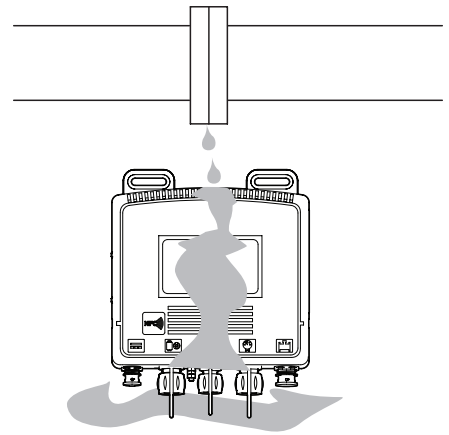
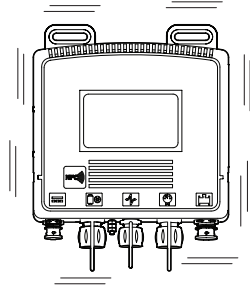


Figure 21 Spillage

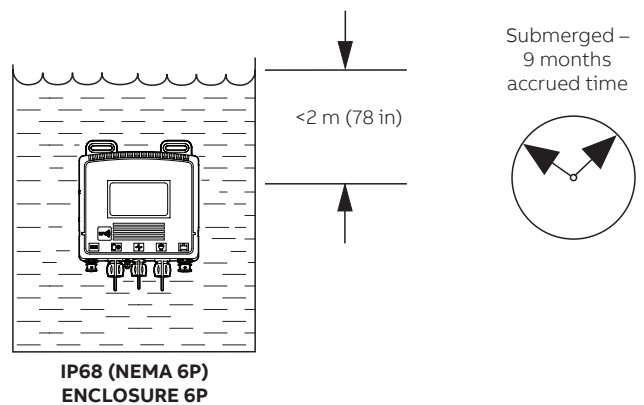


Figure 22 Within environmental rating

...Installation requirements – FET 450

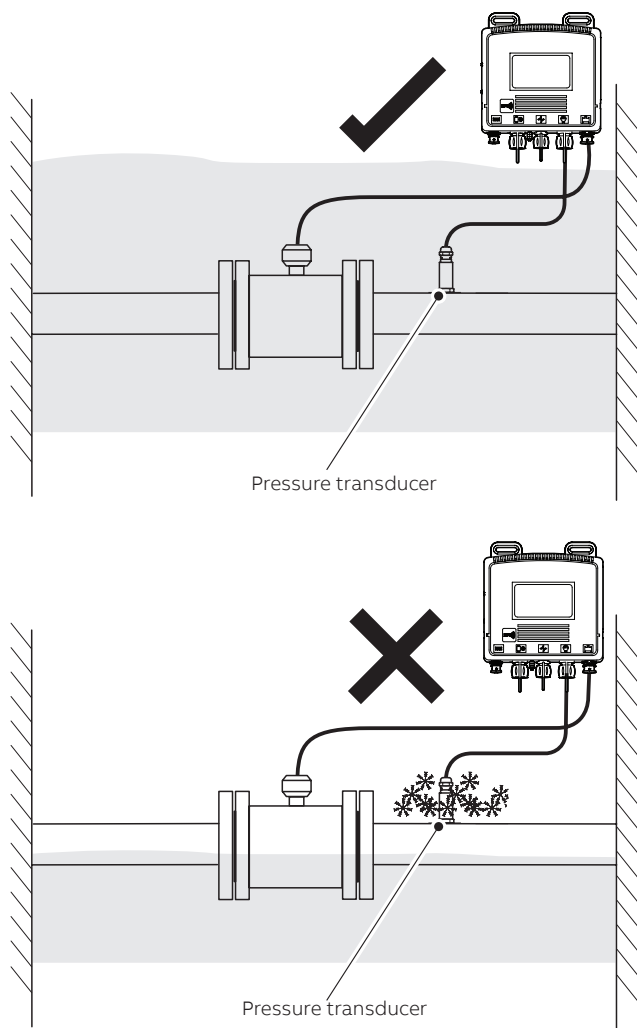


Figure 23 Pressure transducer – protect from frost

For access to display and communication

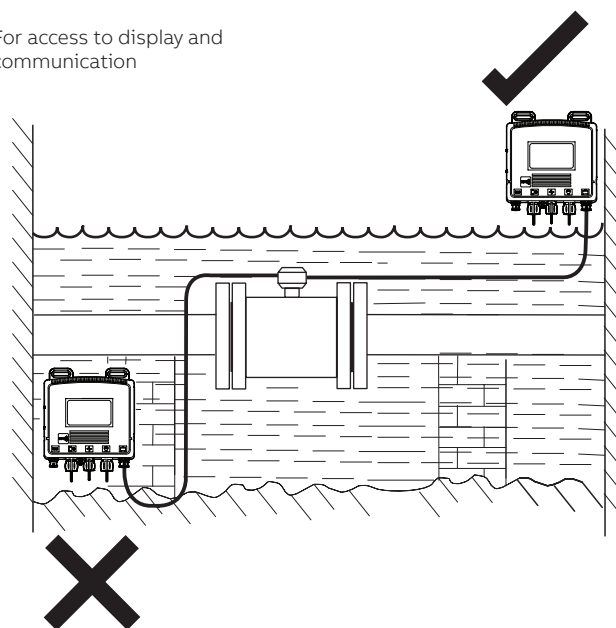


Figure 24 Access to transmitter

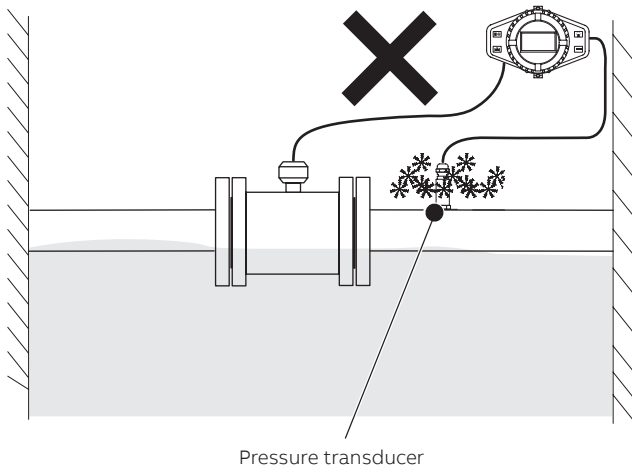
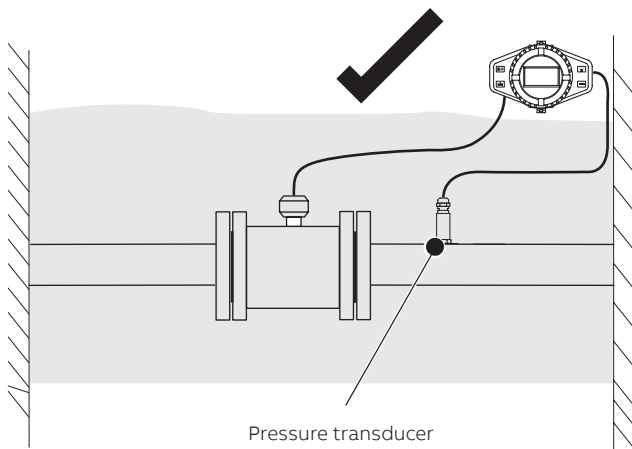


Figure 25 Pressure transducer – protect from frost

For access to display and communication

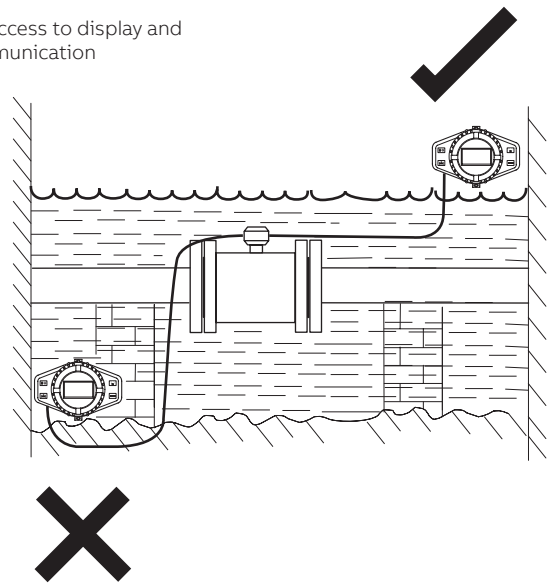


Figure 26 Access to transmitter

AquaMaster4 series differences

	Features	AquaMaster4		
		41X (standard)	43X (advanced)	45X (premium)
Mounting	Integral	✓	✓	✓
	Remote	✓	✓	✓
Sensors	Full bore flanged rubber DN250 to DN2400	✓	✓	✓
	Virtual full bore flanged polypropylene DN40 to DN200	✓	✓	✓
	Reduced bore flanged rubber DN40 to DN600	✓	✓	✓
	Probe 300 to 1000 mm	✓	✓	
Measurement	Class 2/0.5 % calibration	✓		
	Class 2/0.4 % calibration		✓	✓
	Class 1 calibration		✓	✓
	Class 2/0.2 % calibration		✓	✓
	Extended range class 1 and 2 calibration		✓	✓
	Totalizer	✓	✓	✓
	Pressure		✓	✓
	Internal logger		✓	✓
Power	AC (100 to 230 V, 50 or 60 Hz)		✓	✓
	Battery	✓	✓	✓
	Renewable (solar/wind)		✓	✓
Outputs	Digital outputs	✓	✓	✓
	Modbus		✓	✓
	Sensus compatible	✓	✓	
	Mobile communications			✓
Special application needs	Sensor submerged (up to 10 m) or buried (up to 5 m) *	✓	✓	✓
	Retrofit with legacy AquaMaster sensors		✓	✓

*DN40 to 600 reduced bore, DN40 to 200 virtual full bore sensors and DN450 to 2400 full bore sensors

Ordering information

Electromagnetic flowmeter

	1,2,3,4,5,6	7	8,9,10,11	12,13	14	15	16	17,18	19	20,21
Sensor and transmitter										
Standard integral flowmeter	FEW411									
Standard remote flowmeter	FEW412									
Advanced integral flowmeter	FEW431									
Advanced remote flowmeter	FEW432									
Premium integral flowmeter	FEW451									
Premium remote flowmeter	FEW452									
Sensor only										
Standard remote sensor	FEW418									
Advanced remote sensor	FEW438									
Premium remote sensor	FEW458									
Sensor style/liner material										
Full bore/rubber liner		F								
Virtual full bore/polypropylene liner		V								
Reduced bore/rubber liner		R								
Probe/PEEK		A								
Meter size										
DN40 (1½ in)			0040							
DN50 (2 in)			0050							
DN65 (2½ in)			0065							
DN80 (3 in)			0080							
DN100 (4 in)			0100							
DN125 (5 in)			0125							
DN150 (6 in)			0150							
DN200 (8 in)			0200							
DN250 (10 in)			0250							
DN300 (12 in)			0300							
300 mm (12 in) insertion probe length			P030							
DN350 (14 in)			0350							
DN400 (16 in)			0400							
DN450 (18 in)			0450							
DN500 (20 in)			0500							
500 mm (20 in) insertion probe length			P050							
DN600 (24 in)			0600							
DN700 (28 in)			0700							
700 mm (28 in) insertion probe length			P070							
DN750 (30 in)			0750							
DN800 (32 in)			0800							
DN900 (36 in)			0900							
DN1000 (40 in)			1000							
1000 mm (40 in) insertion probe length			P100							
DN1050 (42 in)			1050							
DN1100(44 in)			1100							
DN1200 (48 in)			1200							
DN1350 (54 in)			1350							
DN1400 (56 in)			1400							
DN1500 (60 in)			1500							
DN1600 (64 in)			1600							
DN1650 (66 in)			1650							
DN1800 (72 in)			1800							
DN1950 (78 in)			1950							
DN2000 (80 in)			2000							
DN2100 (84 in)			2100							
DN2200 (88 in)			2200							
DN2400 (96 in)			2400							
Others			9999							

Continued on next page ...

...Ordering information

...Electromagnetic flowmeter

	1,2,3,4,5,6	7	8,9,10,11	12,13	14	15	16	17,18	19	20,21
	See page 53									
Process connection type										
ANSI/ASME B16.5/16.47 series B Class 150 – DN40 to 600 (1½ to 24 in)				A1						
ANSI/ASME B16.5/16.47 series B Class 300 – DN40 to 600 (1½ to 24 in)				A3						
AWWA C207 Class B – DN700 to 2400 (28 to 96 in)				C1						
AWWA C207 Class D – DN700 to 2400 (28 to 96 in)				C2						
AWWA C207 Class E – DN700 to 2400 (28 to 96 in)				C3						
AS 4087 PN 16 – DN40 to 2400 (1½ to 96 in)				E1						
AS 2129 Table E – DN40 to 2400 (1½ to 96 in)				E4						
JIS 7.5K – DN40 to 2400 (1½ to 96 in)				J0						
JIS 10K – DN40 to 2400 (1½ to 96 in)				J1						
JIS 5K – DN40 to 2400 (1½ to 96 in)				J2						
1 in BSP coupling (¾ in pressure tap) – probe only				N1						
1½ in BSP coupling (¾ in pressure tap) – probe only				N2						
1 in NPT coupling (¾ in pressure tap) – probe only				N3						
ISO 7005, DIN, EN 1092 – 1 PN 10 – DN40 to 2400 (1½ to 96 in)				S1						
ISO 7005, DIN, EN 1092 – 1 PN 16 – DN40 to 2400 (1½ to 96 in)				S2						
ISO 7005, DIN, EN 1092 – 1 PN 25 – DN40 to 2400 (1½ to 96 in)				S3						
ISO 7005, DIN, EN 1092 – 1 PN 40 – DN40 to 2400 (1½ to 96 in)				S4						
Others				Z9						
Process connection material										
Carbon steel					B					
Stainless steel carrier (probe only)					J					
Brass seal carrier (probe only)					K					
Without (probe only)					U					
Measuring electrodes material										
Stainless steel 316L (1.4404)						R				
Super austenitic steel (1.4529)						U				
Other						Z				
Grounding accessories										
Without							A			
2 grounding rings (standard)							E			
Protection class – transmitter/sensor										
IP68, NEMA 6P/IP68, NEMA 6P – integral, remote cable not fitted and not potted (IP68 only after potting by others)								80		
IP68, NEMA 6P/IP68, NEMA 6P – remote mount cable fitted and potted								81		
Power supply										
Battery powered – battery not fitted									B	
Battery powered – battery fitted									L	
AC + internal back-up									K	
AC + external back-up – battery not fitted									H	
AC + external back-up – battery fitted									J	
External renewable energy + internal back-up									R	
External renewable energy + internal + external back-up – battery not fitted									M	
External renewable energy + internal + external back-up – battery fitted									N	
Outputs										
Modbus + pulse output *										M4
Pulse output										B1
Sensus communication protocol compatible + pulse output *										S1
4G										C1
4G + pulse output										C2
4G + Modbus + pulse output										C4
nB-IoT										J1
nB-IoT + pulse output										J2
nB-IoT Modbus + pulse output										J4
Without (FEW411, FEW412 and sensor only)										Y0

* With 3KXF221400L0XXX FEW4 sensor cable – see **Accessories** on page 60.

Options – add to order code as required	
Logger and protocol	
Internal logger option	LPN
Internal Logger with MQTT + Sparkplug B	LPQ
Calibration type (3 test points as standard)	
Class 2.5 calibration – FEW411 and FEW412 only	RCS
Class 2/0.5 % factory calibration – FEW411 and FEW412 only	RCC
Class 2/0.4 % factory calibration – standard with FEW43X and FEW45X only	RCD ¹
Class 2/0.2 % factory calibration – option with FEW43X and FEW45X only	RCB ²
Class 1 factory calibration – option with FEW43X and FEW45X only	RCF ²
Extended range Class 2 calibration – option with FEW43X and FEW45X only	RCM ³
Extended range Class 1 calibration – option with FEW43X and FEW45X only	RCN ³
2 % factory calibration (probe only)	RCW
Number of test points	
1	TV1
5	TV5
Signal cable length and type	
5 m (approx. 15 ft)	SC1
10 m (approx. 30 ft)	SC2
20 m (approx. 66 ft)	SC4
30 m (approx. 98 ft)	SC6
50 m (approx. 164 ft)	SCA
100 m (approx. 328 ft)	SCE
150 m (approx. 492 ft)	SCG
Additional cables	
Sensus cable, 5 m	SR1
Sensus cable, 20 m	SR4
Renewable energy cable, 10 m	SP2
Accessories	
1½ in ball valve	AB
RS485 lead with MIL connector for Modbus	AT
NFC to Wall mount Coupler 5 m cable	AJ
NFC to Wall mount Coupler, 10 m cable	AK
NFC to USB, 10 m cable	AL
NFC to USB, 20 m cable	AM
Display protective cover	
Display protective cover without NFC	AD1
Display protective cover with NFC, 5 m cable	AD2
Display protective cover with NFC, 20 m cable	AD3
Mobile Communication Accessories	
Remote antenna 5 m	G7
Remote antenna 10 m	G8
Mobile Communication Territory	
USA, Canada & Mexico	GTA
China	GTC
Australia, Argentina, Columbia, Chile, Brazil, Bolivia Peru & Panama*	GTD
Rest of the world	GTZ
Pressure span	
2000 kPa/20 bar/300 psi	PS3
4000 kPa/40 bar/580 psi	PS4
Pressure transducer	
Remote, cable length 10 m (33 ft)	PT5
Remote, cable length 20 m (65 ft)	PT6
Other usage certifications⁵	
Measuring Instruments Directive (MID)	CM1
OIML R49	CM2
NMI M10/R49	CM3 ⁴
UL Fire Service approval	CMF
PAC	CMP

¹ Calibration option RCD will have a reduced R (Q3/Q1) value without verification and are dependent on optional selection " Other Usage certification - CM2/CM3", refer to table 12 & 13

² Calibration option RCB/RCF will have a reduced R (Q3/Q1) value with verification and are dependent on optional selection " Other Usage certification - CM1/CM2/CM3", refer to table 12 & 13

³ Calibration options RCM/RCN will have a extended R (Q3/Q1) value with verification and are dependent on optional selection "Other Usage certification - CM1/CM2/CM3", refer to page 22 & 26

⁴ Calibration option RCS will have R (Q3/Q1) value without verification and are dependent on optional selection " Other Usage Certification - CM3" refer to page 22 & 26.

⁵ If no selection made, standard factory calibration/verification.

*Contact ABB Sales/Support for any Latin American countries not specified above

...Ordering information

...Electromagnetic flowmeter

Potable water approvals	
WRAS - cold water approval*	CWA
NSF-61#	CWC
AZ/NZS 4020*	CWE
ACS#	CWF
WRAS - 60 °C water approval*	CWK
WRAS - 50 °C water approval*	CWN
Without	CWY
Other options	
With customer property label	KL
Documentation language	
German	M1
Spanish	M3
French	M4
English	M5
Chinese	M6
Polish	M9
Italian	M2
Portuguese	MA
Turkish	MT
Transmitter Software Function Package	
Backward-compatible to legacy AquaMaster Sensors (for FET452 only)	NFL

* Material approval
#Meter Approval

Transmitter

	Product coding field number	1,2,3,4,5,6	7	8,9
Transmitter only				
Standard remote transmitter	FET412			
Advanced remote transmitter	FET432			
Premium remote transmitter	FET452			
Power supply				
Battery powered – battery not fitted			B	
Battery powered – battery fitted			L	
AC + internal back-up			K	
AC + external back-up – battery not fitted			H	
AC + external back-up – battery fitted			J	
External renewable energy + internal back-up			R	
External renewable energy + internal + external back-up – battery not fitted			M	
External renewable energy + internal + external back-up – battery fitted			N	
Outputs				
Modbus				M4
Pulse output				B1
Sensus communication protocol compatible				S1
4G				C1
4G + pulse output				C2
4G + Modbus + pulse output				C4
nB-IoT				J1
nB-IoT + pulse output				J2
nB-IoT + Modbus output + pulse output				J4
Without (FEW411 and FEW412 only)				Y0
Options – add to order code as required				
Logger and protocol				
Internal logger option				LPN
Internal Logger with MQTT + Sparkplug B				LPQ
Additional cables				
Sensus cable, 5 m				SR1
Sensus cable, 20 m				SR4
Renewable energy cable, 10 m				SP2
Accessories				
RS485 lead with MIL connector for Modbus				AT
NFC to Wall mount Coupler, 5 m cable				AJ
NFC to Wall mount Coupler, 10 m cable				AK
NFC to USB, 10 m cable				AL
NFC to USB, 20 m cable				AM
Display protective cover				
Display protective cover without NFC				AD1
Display protective cover with NFC, 5 m cable				AD2
Display protective cover with NFC, 20 m cable				AD3
Mobile Communication Accessories				
Remote antenna 5 m				G7
Remote antenna 10 m				G8
Mobile Communication Territory				
USA, Canada & Mexico				GTA
China				GTC
Australia, Argentina, Columbia, Chile, Brazil, Bolivia, Peru & Panama*				GTD
Rest of the world				GTZ
Pressure span				
2000 kPa/20 bar/300 psi				PS3
4000 kPa/40 bar/580 psi				PS4
Pressure transducer				
Remote, cable length 10 m (33 ft)				PT5
Remote, cable length 20 m (65 ft)				PT6
Other usage certifications				
OIML R49				CM2
NMI M10				CM3
Documentation language				
German				M1
Spanish				M3
French				M4
English				M5
Chinese				M6
Polish				M9
Italian				M2
Portuguese				MA
Turkish				MT
Transmitter Software Function Package				
Backward-compatible to legacy AquaMaster Sensors (for FET452 only)				NFL

...Ordering information

...Transmitter

Probe bore gauge tool

	1,2,3,4	5	6,7,8,9
Probe bore gauge tool	APBGT		
Housing			
R1 housing		2	
Bore size			
700 mm			700
760 mm			760
800 mm			800
900 mm			900
1000 mm			1000
1100 mm			1100
1200 mm			1200
1400 mm			1400
1500 mm			1500
1600 mm			1600
1800 mm			1800
2000 mm			2000
2200 mm			2200

Transmitter electronics only

	1,2,3,4, 5, 6	7	8,9
Standard integral transmitter generic	F E T 4 1 9		
Standard remote transmitter generic	F E T 4 1 0		
Advanced integral transmitter generic	F E T 4 3 9		
Advanced remote transmitter generic	F E T 4 3 0		
Power supply			
Battery powered – battery not fitted		B	
AC + internal back-up		K	
External renewable energy + internal back-up		R	
Outputs			
Modbus			M4
Pulse output			B1
Sensus communication protocol compatible			S1
Without			Y0

Additional codes to be added as required	MT
Logger and protocol	
Internal logger option	LPN
Pressure span	
2000 kPa/20 bar/300 psi	PS3
4000 kPa/40 bar/580 psi	PS4
Others	PSZ
Pressure transducer	
Remote, cable length 10 m (33 ft)	PT5
Remote, cable length 20 m (65 ft)	PT6
Documentation language	
German	M1
Spanish	M3
French	M4
English	M5
Chinese	M6
Polish	M9
Italian	M2
Portuguese	MA
Turkish	MT

Calibration/flow accuracy specification table

Calibration of the flowmeter to different calibration types and other usage certifications is done to meet the following values of R (Q3/Q1) for sizes DN40 to DN600.

Table 13 Calibration/verification of calibration values for "Other Usage Certification" MID (CM1)/OIML (CM2), Reduced Bore Sensor sizes DN40 - 600

DN	Reduced bore sensor			
	Mains powered		Battery/renewable energy powered	
	Class 2	Class 1	Class 2	Class 1
40	250	200	160	100
50	250	200	160	100
65	250	200	160	100
80	250	200	160	100
100	250	200	160	100
125	250	200	160	100
150	250	200	160	100
200	250	200	160	100
250	250	200	160	100
300	250	200	160	100
350	250	200	63	63
400	160	200	63	63
450	160	200	63	63
500	160	200	63	40
600	160	200	63	40

Table 14 Calibration/verification of calibration values for "Other Usage Certification" MID (CM1)/OIML (CM2), Full Bore Sensor sizes DN40 - 600

DN	Full bore sensor			
	Mains powered		Battery/renewable energy powered	
	Class 2	Class 1	Class 2	Class 1
40	200	125	80	63
50	200	125	80	63
65	200	125	80	63
80	200	125	80	63
100	200	125	80	63
125	200	125	80	63
150	200	125	80	63
200	200	125	80	63
250	200	125	80	63
300	200	125	80	63
350	80	80	80	63
400	80	80	80	63
450	80	80	80	63
500	80	80	80	63
600	80	80	80	63
700	80	80	40	40
750	80	80	40	40
800	80	80	40	40
900	63	40	40	-
1000	63	40	40	-
1050	63	40	40	-
1100	63	-	40	-
1200	63	-	40	-

Accessories

Ordering code	Description
3KXF208400L0100	AM4 battery pack 10 lithium D cells
3KXF208400L0200	AM4 battery pack 50 lithium D cells
3KXF208400L0300	AM4 display protective cover
3KXF208400L0400	AM4 display protective cover NFC 5 m cable
3KXF208400L0500	AM4 display cover NFC 20 m Cable
3KXF208400L0600	AM4 RS485 lead Mil connectors Modbus
3KXF221400L0100	FEW4 sensor/pulse/Modbus cable 5 m (15 ft approx.)
3KXF221400L0200	FEW4 sensor/pulse/Modbus cable 10 m (30 ft approx.)
3KXF221400L0300	FEW4 sensor/pulse/Modbus cable 20 m (66 ft approx.)
3KXF221400L0400	FEW4 sensor/pulse/Modbus cable 30 m (98 ft approx.)
3KXF221400L0500	FEW4 sensor/pulse/Modbus cable 50 m (164 ft approx.)
3KXF221400L0600	FEW4 sensor cable 100 m junction box/Mil
3KXF221400L0700	FEW4 sensor cable 150 m junction box/Mil
3KXF221400L0800	FEW4 sensor cable 500 m
3KXF221400L0900	FEW4 junction box and cable – M20 to Mil
3KXF208400L0700	AM4 Sensus cable 5 m (15 ft approx.)
3KXF208400L0800	AM4 Sensus cable 20 m (66 ft approx.)
3KXF208400L0900	AM4 renewable energy cable 10 m
3KXF208400L1000	AM4 pulse output cable 1 m
3KXF208400L2100	AM4 pressure transducer 20 bar 10 m
3KXF208400L2200	AM4 pressure transducer 20 bar 20 m
3KXF208400L2500	AM4 pressure transducer 40 bar 10 m
3KXF208400L2600	AM4 pressure transducer 40 bar 20 m
3KXF221400L1100	FEW4 terminal box potting compound 200 g
3KXF221400L1200	FEW4 ball valve stainless steel 1½ in BSP
3KXF221400L1300	FEW4 bush stainless steel 1½ in M x 1 in BSP
3KXF221400L1400	FEW4 ball valve stainless steel 1½ in NPT
3KXF221400L1500	FEW4 bush stainless steel 1½ in M x 1 in NPT
3KXF221400L1600	FEW4 AquaProbe seal replacement kit
3KXF208400L2700	AM4 transmitter seal kit
3KXF208400L2800	AM4 battery connector kit
3KXF221400L1700	FEW4 preamp board and potting kit
3KXF208400L2900	AquaMaster 4 – demonstration kit (FEX41X/FEX43X)
3KXF221400L1800	FEW4 terminal box maintenance kit
3KXF208400L3000	AM4 antitamper security kit
3KXF208400L3100	AM4 remote transmitter mounting bracket kit
3KXF221400L1900	FEW4 earth strap kit
3KXF208400L3700	External battery PSU with batteries not fitted for Tx (FET450)
3KXF208400L3800	External battery PSU with batteries fitted for Tx (FET450)
3KXF208400L3900	AC PSU with D-cell batteries not fitted for Tx (FET450)
3KXF208400L4000	AC PSU with D-cell batteries fitted for Tx (FET450)
3KXF208400L4100	Renewable PSU with D-cell batteries not fitted for Tx (FET450)
3KXF208400L4200	Renewable PSU with D-cell batteries fitted for Tx (FET450)
3KXF208400L5200	NFC to USB, 10 m cable for FEX450
3KXF208400L5300	NFC to USB, 20 m cable for FEX450

Ordering code	Description
3KXF208400L4400	NFC to wall mount coupler, 5 m (FEX450)
3KXF208400L4500	NFC to wall mount coupler, 20 m (FEX450)
3KXF208400L4600	Battery holder sub-assembly for AC/Ren operated Tx (FET450)
3KXF208400L4700	Battery holder subassembly for battery operated Tx (FET450)
3KXF208400L4800	Demo kit for AM4 Mobile Comms with NB-IOT for China
3KXF208400L4900	Demo kit for AM4 Mobile Comms with 4G for Europe and Asia
3KXF208400L5000	Demo kit for AM4 Mobile Comms with 4G for North America
3KXF208400L5100	Demo kit for AM4 Mobile Comms with 4G for Australia
3KXF208400L5600	FET450 PSU Mounting Bracket

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- Sensus is a registered trademark of Sensus USA, Inc.
- Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries.

Notes

Sales



Service



Software



Notes

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www.abb.com/measurement

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EXP. 51/2025/SMSQV/CO

Bon día,

En aquest document verifiquem que el cabalimetre ofertat CAUDALIMETRO ELECTROMAGNETICO ABB AQUAMASTER 4 (INTEGRADO) es amb sortida rs485-modbus rtu totalment compatible amb LoRaWAN.

Firmado,

En Rubí a 22 de Julio de 2025

47736183M

GABRIEL

GALLARDO (R:

B60917143)

Firmado digitalmente
por 47736183M
GABRIEL GALLARDO (R:
B60917143)
Fecha: 2025.07.22
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