



Flow Rate Transmitter HFT 3100 Ex applications

Turbine

High accuracy

Additional measuring connections

Intrinsically Safe, Dustproof enclosure
Non-Sparking
ATEX, IECEx, double approval
HART interface



Description:

The HFT 3100 with HART interface is an intrinsically safe compact flow rate transmitter for measuring flow rates in hydraulic systems. The double approval in accordance with ATEX and IECEx enables universal, almost worldwide utilisation of the devices in potentially explosive atmospheres.

The current flow is determined acc. to the turbine principle, by means of a highly accurate and robust sensor. In addition to the analogue 4 .. 20 mA output of the measured value, digital communication is possible by means of the HART protocol.

The main fields of application are in the oil & gas industry, gas turbines. The device is also used in mining applications as well as in locations with high dust contamination.

Two additional threaded bore holes in the turbine housing provide the flow rate transmitter with additional connection options for temperature and pressure sensors.

Protection types and applications:

ATEX

I M1	Ex ia	I	Ma
II 1G	Ex ia	IIC	T6, T5 Ga
II 1/2 G	Ex ia	IIC	T6, T5 Ga/Gb
II 2 G	Ex ia	IIC	T6, T5 Gb
II 1D	Ex ia	IIIC	T85 °C/T95 °C Da
II 1D	Ex ta	IIIC	T80/90/100 °C
			T ₅₀₀ 90/T ₅₀₀ 100/T ₅₀₀ 110 °C Da
II 2D	Ex tb	IIIC	T80/T90/T100 °C Db
II 3G	Ex nA	IIC	T6, T5, T4 Gc
II 3G	Ex ic	IIC	T6, T5, T4 Gc
II 3D	Ex tc	IIIC	T80/T90/T100 °C Dc
II 3D	Ex ic	IIIC	T80/T90/T100 °C Dc

IECEx

Ex ia	I	Ma
Ex ia	IIC	T6, T5 Ga
Ex ia	IIC	T6, T5 Ga/Gb
Ex ia	IIC	T6, T5 Gb
Ex ia	IIIC	T85/T95 °C Da
Ex ta	IIIC	T80/T90/T100 °C
		T ₅₀₀ 90/T ₅₀₀ 100/T ₅₀₀ 110 °C Da
Ex tb	IIIC	T80/T90/T100 °C Db
Ex nA	IIC	T6, T5, T4 Gc
Ex ic	IIC	T6, T5, T4 Gc
Ex tc	IIIC	T80/T90/T100 °C Dc
Ex ic	IIIC	T80/T90/T100 °C Dc

Technical data:

Input data

Measuring range and operating pressure	1.2 .. 20.0 l/min	420 bar
	6.0 .. 60.0 l/min	420 bar
	15.0 .. 300.0 l/min	420 bar
	40.0 .. 600.0 l/min	420 bar

Additional connection options ¹⁾ 2x G 1/4 female threads for pressure or temperature sensors with relevant approvals

Housing material	Stainless steel 1.4404
Parts in contact with fluid	Stainless steel: 1.4404, 1.4460, tungsten carbide

Output data

Output signal, permitted load resistance	4 .. 20 mA, 2-conductor, with HART protocol
	$R_{Lmax} = (U_b - 12 V) / 20 \text{ mA} [\text{k}\Omega]$
	for HART communication min. 250 Ω
	HART communication acc. to HART 7 specifications
	HART Common Practice Commands, e.g. altering of measuring range limits (see table)

Accuracy $\leq 2\%$ of the actual value

Environmental conditions

Operating/ambient temperature range	T6, T80/T85 °C, T ₅₀₀ 90 °C	Ta = -40 .. +60 °C
	T5, T90/T95 °C, T ₅₀₀ 100 °C	Ta = -40 .. +70 °C
	T100 °C, T ₅₀₀ 110 °C	Ta = -40 .. +80 °C
	T4	Ta = -40 .. +85 °C

Storage temperature range -40 .. +100 °C

Fluid temperature range	T6, T80, T85 °C, T ₅₀₀ 90 °C	Ta = -40 .. +60 °C
	T5, T90, T95 °C, T ₅₀₀ 100 °C	Ta = -40 .. +70 °C
	T100 °C, T ₅₀₀ 110 °C	Ta = -40 .. +80 °C
	T4	Ta = -40 .. +85 °C

CE mark

EN 61000-6-1 / 2 / 3 / 4, EN 60079-0 / 11 / 15 / 26 / 31, EN 50303

Vibration resistance acc. to $\leq 10 \text{ g}$

DIN EN 60068-2-6 at 10 .. 500 Hz

Protection class acc. to DIN EN 60529 ²⁾ IP 67

Relevant data for Ex applications

	Ex ia, ic	Ex nA, ta, tb, tc
Supply voltage	Ui = 12 .. 28 V DC	12 .. 28 V DC
Max. input current	li = 100 mA	
Max. input power	Pi = 0.7 W	Max. power consumption $\leq 1 \text{ W}$
Connection capacitance of the sensor	Ci $\leq 22 \text{ nF}$	
Inductance of the sensor	Li = 0 mH	
Insulation voltage	50 V AC, with integrated overvoltage protection acc. to EN 61000-6-2	

Other data

Measuring medium	Hydraulic oil, water based fluid
Viscosity range	1 .. 100 cSt
Calibration viscosity	30 cSt
Residual ripple of supply voltage	Acc. to FSK Physical Layer Specification (HCF_SPEC_054)
Current consumption	$\leq 25 \text{ mA}$
Weight	
HFT 311X-F21-0020	2.5 kg
HFT 311X-F21-0060	4.0 kg
HFT 311X-F21-0300	5.7 kg
HFT 311X-F21-0600	7.0 kg

Note: Reverse polarity protection of the supply voltage, overvoltage, override and short circuit protection are provided.

¹⁾ Not for measuring ranges 1.2 .. 20 l/min

²⁾ With mounted mating connector in corresponding protection class

Measuring Range Limits:

By means of HART Common Practice Commands, you have the opportunity to adjust the following measuring range limits:

Lower measuring range limit		Upper measuring range limit		Measuring span	
min	max	min	max	min	max
0 % FS	75 % FS	25 % FS	100 % FS	25 % FS	100 % FS

Fields of application:

Code no. for use in model code	1	9	A	C	
ATEX DEKRA 13ATEX0031X DEKRA 13ATEX0032	I M1 Ex ia I Ma II 1G Ex ia IIC T6, T5 Ga II 1/2G Ex ia IIC T6, T5 Ga/Gb II 1D Ex ia IIIC T85/T95 °C Da	II 2G Ex ia IIC T6, T5 Gb	II 3G Ex nA IIC T6, T5 Gc II 1D Ex ta IIIC T80/T90 °C T ₅₀₀ 90/T ₅₀₀ 100 °C Da II 2D Ex tb IIIC T80/T90 °C Db	II 3G Ex ic IIC T6, T5 Gc II 3D Ex ic IIIC T80/T90 °C Dc	
IECEX DEK 14.0011X	Ex ia I Ma Ex ia IIC T6, T5 Ga Ex ia IIC T6, T5 Ga/Gb Ex ia IIIC T85/T95 °C Da	Ex ia IIC T6, T5 Gb	Ex nA IIC T6, T5 Gc Ex ta IIIC T80/T90 °C T ₅₀₀ 90/T ₅₀₀ 100 °C Da Ex tb IIIC T80/T90 °C Db	Ex ic IIC T6, T5 Gc Ex ic IIIC T80/T90 °C Dc	
Application fields	Mining Protection type: intrinsically safe ia with barrier	Gases/conductive dust Protection type: intrinsically safe ia with barrier	Gases Protection type: non-sparking nA	Gases/conductive dust Protection type: dustproof enclosure	Gases/conductive dust Protection type: intrinsically safe ic with barrier

Instruments for other protection types and zones (see cover) are available upon request.

Model code:

HFT 3 1 X X - F21 - XXXX - S - X-ENX-000

Mechanical process connection

- 1 = G 1/4" only for measuring range: 1.2 .. 20 l/min
- 3 = G 1/2" only for measuring range: 6.0 .. 60 l/min
- 6 = G 1 1/4" only for measuring range: 15 .. 300 l/min
- 7 = G 1 1/2" only for measuring range: 40 .. 600 l/min

Electrical connection

- 6 = male M12x1, 4 pole (mating connector not supplied)

Output signal

- F21 = 4 .. 20 mA, 2-conductor, with HART protocol (4 mA ± 0 l/min)

Measuring ranges

- 0020 = 1.2 .. 20 l/min
- 0060 = 6.0 .. 60 l/min
- 0300 = 15.0 .. 300 l/min
- 0600 = 40.0 .. 600 l/min

Housing material

- S = stainless steel

Housing design

- 1 = without additional hole (measuring range 0020)
- 2 = with two additional female threads G 1/4 ISO 1179-2 (measuring ranges 0060, 0300, 0600)

Approval

- E = ATEX and IECEX

Insulation voltage

- N = 50 V AC to housing

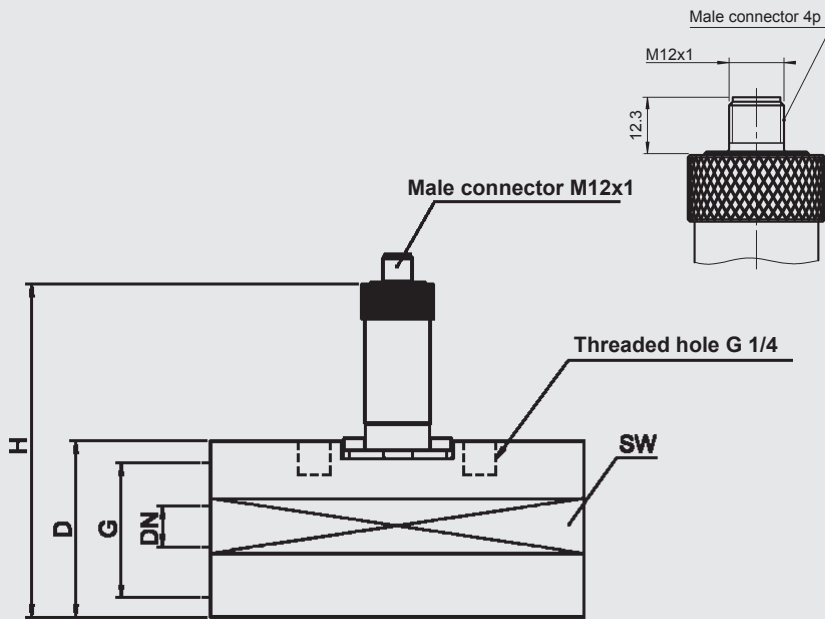
Protection types and applications (code)

	ATEX	IECEX
1 =	I M1 Ex ia I Ma II 1G Ex ia IIC T6, T5 Ga II 1/2 G Ex ia IIC T6, T5 Ga/Gb II 2 G Ex ia IIC T6, T5 Gb II 1D Ex ia IIIC T85/T95 °C Da	Ex ia I Ma Ex ia IIC T6, T5 Ga Ex ia IIC T6, T5 Ga/Gb Ex ia IIC T6, T5 Gb Ex ia IIC T85/T95 °C Da
9 =	II 3G Ex nA IIC T6, T5 Gc	Ex nA IIC T6, T5 Gc Only in conjunction with impact protection metal safety sleeve (see dimensions)
A =	II 1D Ex ta IIIC T80/T90 °C Da T ₅₀₀ 90/T ₅₀₀ 100 °C Da II 2D Ex tb IIIC T80/T90 °C Db	Ex ta IIIC T80/T90 °C T ₅₀₀ 90/T ₅₀₀ 100 °C Da Ex tb IIIC T80/T90 °C Db Only in conjunction with impact protection metal safety sleeve (see dimensions)
C =	II 3G Ex ic IIC T6, T5 Gc II 3D Ex ic IIIC T80/T90 °C Dc	Ex ic IIC T6, T5 Gc Ex ic IIIC T80/T90 °C Dc

Modification number

- 000 = standard

Dimensions:



Without threaded holes for temperature and pressure sensors:

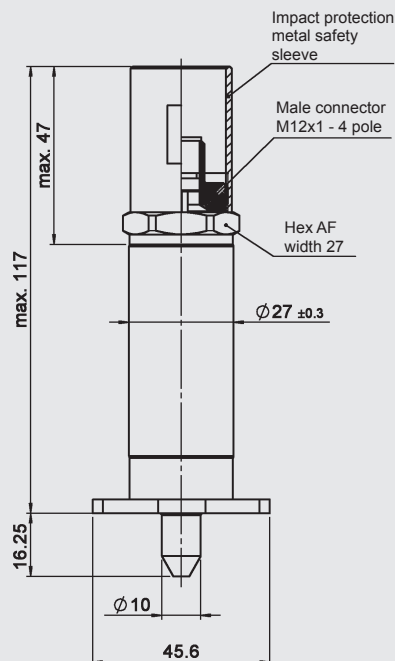
Model	Meas. range [l/min]	L [mm]	H [mm]	D / SW [mm]	G	Torque [Nm]	DN [mm]
HFT 31XX-F21-0020	1.2 .. 20	117	158	60 / 56	G $\frac{1}{4}$ "	35	7

With threaded holes for temperature and pressure sensors:

Model	Meas. range [l/min]	L [mm]	H [mm]	D / SW [mm]	G	Torque [Nm]	DN [mm]
HFT 31XX-F21-0060	6 .. 60	144	160	63 / 60	G $\frac{1}{2}$ "	65	11
HFT 31XX-F21-0300	15 .. 300	155	173	75.5 / 72	G $1\frac{1}{4}$ "	240	22
HFT 31XX-F21-0600	40 .. 600	181	178	81 / 76	G $1\frac{1}{2}$ "	290	30

With impact protection metal safety sleeve:

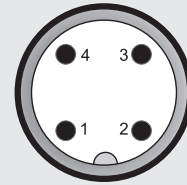
Protection types and applications: (code): 9, A



The impact protection metal safety sleeve is included in delivery. A straight mating connector is required for electrical connection; e.g. mating connector M12x1, 4 pole, straight, with 3 m shielded cable: ZBE 06S-03, Part no. 6098243

Pin connections:

M12x1



Pin	HFT 31x6-F21
1	Signal +
2	n.c.
3	Signal -
4	n.c.

Note:

The information in this brochure relates to the operating conditions and applications described. For applications or operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

HYDAC ELECTRONIC GMBH
 Hauptstraße 27, 66128 Saarbrücken
 Germany
 Telephone +49 (0)6897 509-01
 Fax +49 (0)6897 509-1726
 E-mail: electronic@hydac.com
 Internet: www.hydac.com

