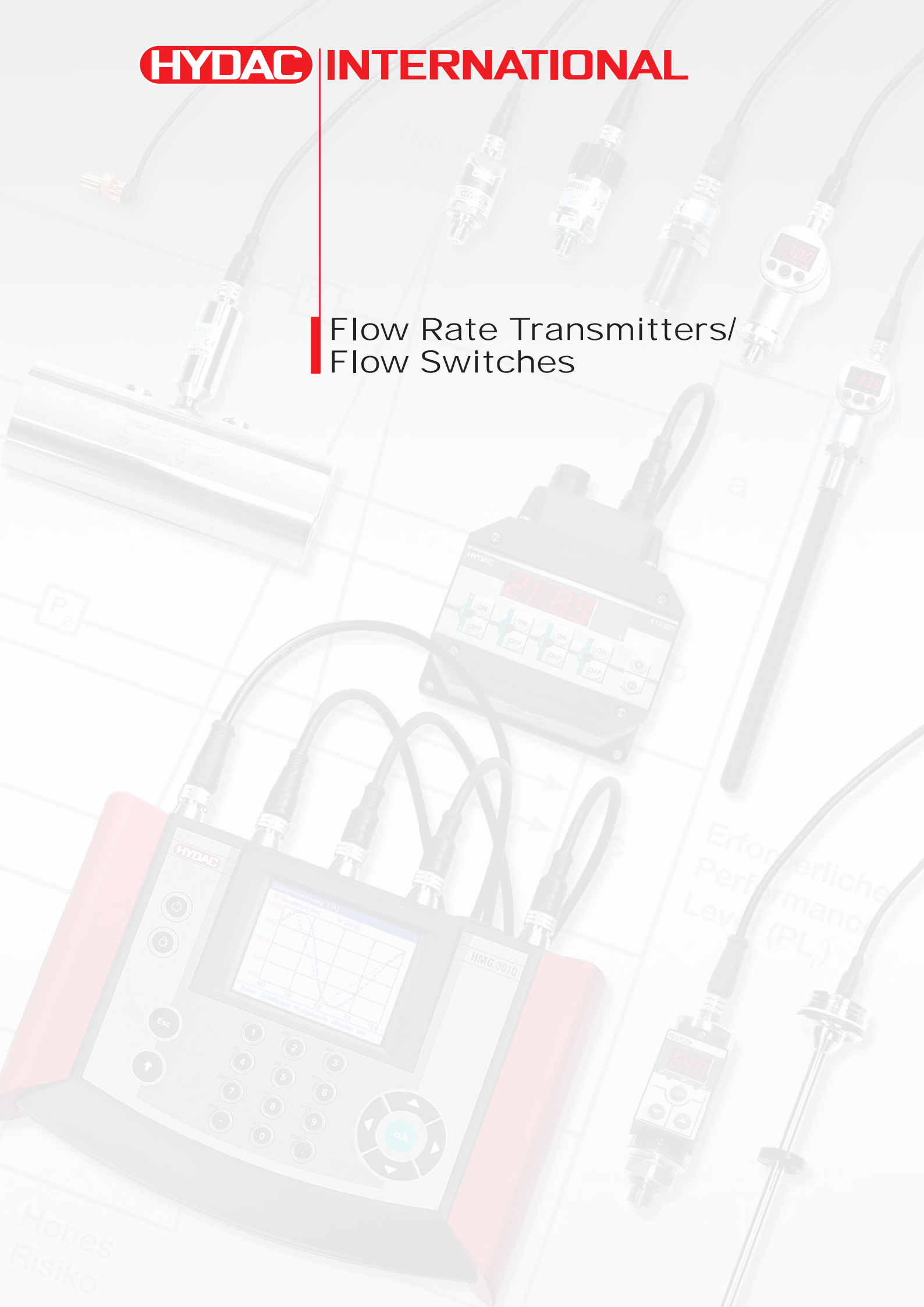


## Flow Rate Transmitters/ Flow Switches



## FLOW RATE TRANSMITTERS FLOW SWITCHES

To measure the flow rate in machines and systems HYDAC ELECTRONIC offers various flow rate transmitters and flow switches.

The flow rate transmitter of the EVS 3000 series operates according to the turbine principle (measuring the rpm of an impeller rotating in the fluid flow). Depending on the model, additional connection ports are available for pressure and/or temperature transmitters.

The HYDAC flow switches and transmitters in the HFS 2000 and HFT 2000 series are based on the variable area float principle. The test medium deflects a spring-loaded float in the direction of the flow, depending on the flow rate. A reed contact is attached to the outside of the instrument. When the magnet inside the float reaches the preset position, the reed contact will switch.

Electronic flow rate transmitters for general applications:

EVS 3110

EVS 3100

Electromechanical flow switches and transmitters for general applications:







HFS 2100

HFS 2500

HFT 2100

HFT 2500

Further flow rate transmitters for special applications can be found in the section "Service Instruments".

Flow rate sensors, flow switches	EVS 3110 	EVS 3100 	HFS 2100 	HFS 2500 	HFT 2100 	HFT 2500 
Accuracy (max. error)	2	2	10	5	10	3
Pressure-resistant	✓	✓	✓	✓	✓	✓
Water-based media	✓			✓		✓
Oil / viscous fluids		✓	✓		✓	
Direction of flow optional	✓	✓				
Installation position optional	✓	✓	✓	✓	✓	✓
Max. number of switching contacts			2	2		
Analog output	✓	✓			✓	✓
Display			✓	✓		
ATEX Intrinsically safe			✓	✓		

**Note:**  
Not all feature combinations are possible. For precise information, please consult the relevant data sheet.



## Electronic Flow Rate Transmitter EVS 3110 for Water-Based Fluids

### Description:

The flow rate transmitters in the EVS 3110 series (stainless steel series) are specially designed for use in hydraulic and other fluid technology systems.

They operate according to the turbine principle, i.e. the speed of an impeller turning in the fluid flow is measured and converted into a 4 ... 20 mA analog signal.

On the EVS 3110 stainless steel range, the impeller has a carbide bearing and the resulting increased robustness also makes it suitable for use in pulsating, dynamic applications.

Two further G1/4 threaded holes in the turbine housing allow additional devices to be connected, e.g. temperature and pressure transmitters.

### Special features:

- Suitable for pressures up to 5800 psi
- Viscosities of 1 .. 100 cSt
- Output signal 4 .. 20 mA
- Additional connection of temperature and / or pressure transmitters possible

### Technical data:

#### Input data

Measuring ranges<sup>1)</sup> and operating pressure

EVS 311X-A-0020	0.26 .. 5.28 gpm	5800 psi
EVS 311X-A-0060	1.59 .. 15.9 gpm	5800 psi
EVS 311X-A-0300	3.96 .. 79.3 gpm	5800 psi
EVS 311X-A-0600	10.6 .. 159 gpm	5800 psi

Additional connection options 2 x G1/4 female threads for pressure and/or temperature sensors

#### Output data

Output signal, permitted load resistance 4 .. 20 mA, 2 conductor  
 $R_{Lmax} = (U_B - 10 \text{ V}) / 20 \text{ mA} [\text{k}\Omega]$

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

#### Environmental conditions

Compensated temperature range -4 .. 158 °F

Operating temperature range -4 .. 158 °F

Storage temperature range -40 .. +212 °F

Fluid temperature range -4 .. +194 °F

CE mark EN 61000-6-1 / 2 / 3 / 4

Protection class to IEC 60529 IP 65 (Binder 714 M18)  
 IP 67 (M12x1, when an IP 67 connector is used)

#### Other data

Housing material Stainless steel

Test medium<sup>2)</sup> Water-based fluids

Viscosity range 1 .. 100 cSt

Calibration viscosity 5 cSt

Supply voltage 10 .. 32 V DC

Residual ripple of supply voltage  $\leq 5\%$

Weight ~ 1790 g ( 0.26 .. 5.28 gpm)

~ 2100 g ( 1.59 .. 15.9 gpm)

~ 3320 g ( 3.96 .. 79.3 gpm)

~ 3500 g ( 10.6 .. 159 gpm)

Note: <sup>1)</sup> Other measuring ranges on request

<sup>2)</sup> Other fluids on request

## Model code:

EVS 3 1 1 X - A - XXXX - 000

### Housing material

1 = Stainless steel

### Electrical connection

4 = Male 4 pole Binder series 714 M18  
(connector not supplied)

6 = Male M12x1, 4 pole  
(connector not supplied)

### Signal

A = 4 .. 20 mA, 2 conductor

### Measuring range

0020 = 0.26 .. 5.28 gpm

0060 = 1.59 .. 15.9 gpm

0300 = 3.96 .. 79.3 gpm

0600 = 10.6 .. 159 gpm

### Modification number

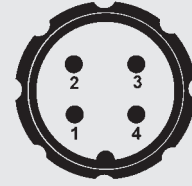
000 = Standard

### Accessories:

Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

## Pin connections:

Binder series 714 M18



Pin EVS 3114-A

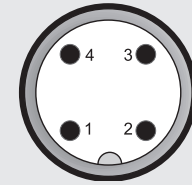
1 reserved

2 Signal +

3 Signal -

4 reserved

M12x1



Pin EVS 3116-A

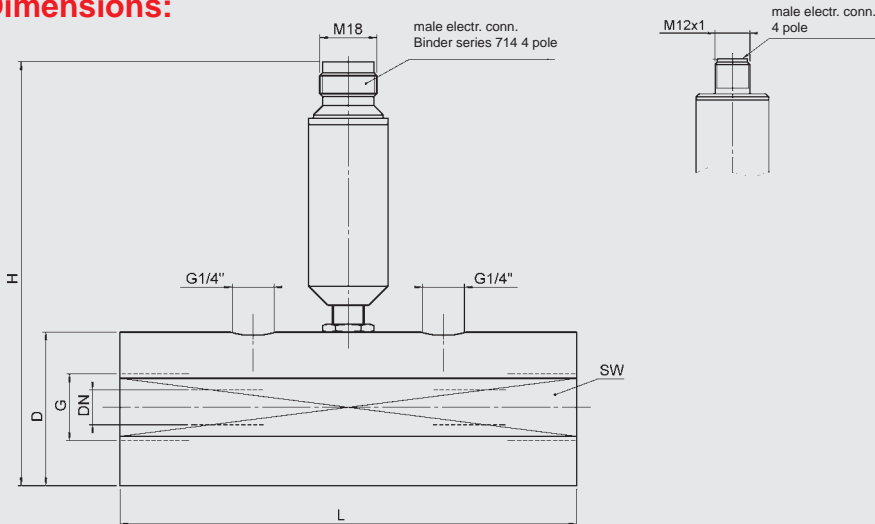
1 Signal +

2 reserved

3 Signal -

4 reserved

## Dimensions:



Model	Meas. range [gpm]	L [mm]	H [mm]	D / SW [mm]	G	Torque value [Nm(lb-ft)]	DN [mm]
EVS 311X-A-0020	0.26 .. 5.28	117	135	47 / 46	G $\frac{1}{4}$ "	60(44)	7
EVS 311X-A-0060	1.59 .. 15.9	144	135	48.5 / 46	G $\frac{1}{2}$ "	130(95)	11
EVS 311X-A-0300	3.96 .. 79.3	155	150	63.5 / 60	G $1\frac{1}{4}$ "	500(370)	22
EVS 311X-A-0600	10.6 .. 159	181	150	63.5 / 60	G $1\frac{1}{2}$ "	600(440)	30

## 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.

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## Electronic Flow Rate Transmitter EVS 3100 for Oils / Viscous Fluids

### Description:

The flow rate transmitters of the EVS 3100 series (aluminium series) are specially designed for use in hydraulic and other fluid technology systems. They operate according to the turbine principle, i.e. the speed of an impeller turning in the fluid flow is measured and converted into a 4 ... 20 mA analog signal.

Two further G1/4 threaded holes in the turbine housing allow additional units to be connected, e.g. temperature and pressure transmitters.

### Special features:

- Pressure resistant to 5800 psi (depending on model)
- Viscosities of 1 .. 100 cSt
- Output signal 4 .. 20 mA
- Additional connection of temperature and / or pressure transmitters possible

### Technical data:

Input data		
Measuring ranges <sup>1)</sup> and operating pressure		
EVS 310X-A-0020	0.26 .. 5.28 gpm	5800 psi
EVS 310X-A-0060	1.59 .. 15.9 gpm	5800 psi
EVS 310X-A-0300	3.96 .. 79.3 gpm	5800 psi
EVS 310X-A-0600	10.6 .. 159 gpm	4567 psi
Additional connection options		2 x G1/4 female threads for pressure and/or temperature sensors
Output data		
Output signal, permitted load resistance		4 .. 20 mA, 2 conductor $R_{Lmax} = (U_B - 10 V) / 20 mA [k\Omega]$
Accuracy		≤ 2 % of the actual value
Environmental conditions		
Compensated temperature range		-4 .. 158 °F
Operating temperature range		-4 .. 158 °F
Storage temperature range		-40 .. +212 °F
Fluid temperature range		-4 .. +194 °F
CE mark		EN 61000-6-1 / 2 / 3 / 4
Protection class to IEC 60529		IP 65 (Binder 714 M18) IP 67 (M12x1, when an IP 67 connector is used)
Other data		
Housing material		Aluminium
Measuring medium <sup>2)</sup>		Hydraulic oils
Viscosity range		1 .. 100 cSt
Calibration viscosity		30 cSt
Supply voltage		10 .. 32 V DC
Residual ripple of supply voltage		≤ 5 %
Weight		~ 730 g ( 0.26 .. 5.28 gpm) ~ 860 g ( 1.59 .. 15.9 gpm) ~ 1410 g ( 3.96 .. 79.3 gpm) ~ 1530 g ( 10.6 .. 159 gpm)

Note: <sup>1)</sup> Other measuring ranges on request  
<sup>2)</sup> Other fluids on request

## Model code:

EVS 3 1 0 X - A - XXXX - 000

### Housing material

0 = Aluminium

### Electrical connection

4 = Male 4 pole Binder series 714 M18  
(connector not supplied)

6 = Male M12x1, 4 pole  
(connector not supplied)

### Signal

A = 4 .. 20 mA, 2 conductor

### Measuring range

0020 = 0.26 .. 5.28 gpm

0060 = 1.59 .. 15.9 gpm

0300 = 3.96 .. 79.3 gpm

0600 = 10.6 .. 159 gpm

### Modification number

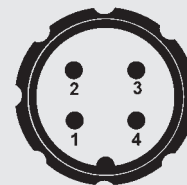
000 = Standard

### Accessories:

Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

## Pin connections:

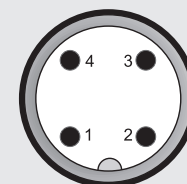
Binder series 714 M18



Pin EVS 3104-A

1	reserved
2	Signal +
3	Signal -
4	reserved

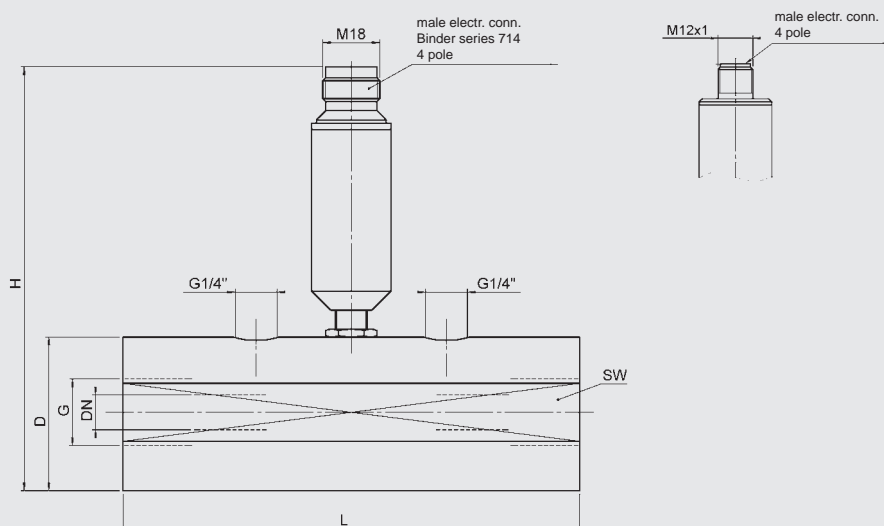
M12x1



Pin EVS 3106-A

1	Signal +
2	reserved
3	Signal -
4	reserved

## Dimensions:



Model	Meas. range [l/min]	L [mm]	H [mm]	D / SW [mm]	G	Torque value [Nm(lb-ft)]	DN [mm]
EVS 310X-A-0020	0.26.. 5.28	117	135	47 / 46	G 1/4"	60(44)	7
EVS 310X-A-0060	1.59.. 15.9	144	135	48.5 / 46	G 1/2"	130(95)	11
EVS 310X-A-0300	3.96.. 79.3	155	150	63.5 / 60	G 1 1/4"	500(370)	22
EVS 310X-A-0600	10.6.. 159	181	150	63.5 / 60	G 1 1/2"	600(440)	30

## 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 ELECTRONICS

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## Electro-mechanical Flow Switch HFS 2100 for Oils / Viscous Fluids

### Description:

The HYDAC flow switches of the HFS 2100 series are based on a variable area float principle and are position-independent. The test medium deflects a spring-loaded float in the direction of flow, depending on the flow rate. A reed contact is fitted to the outside of the device and is therefore separate from the flow circuit. When the magnet inside the float reaches the preset position, the reed contact will switch.

To protect it from external influences, the switch is encapsulated in a casing designed to allow steplessly variable adjustment.

The instruments are designed to be capable of monitoring threshold values reliably, even when the viscosity fluctuates. The kinematic viscosity may vary between 30 and 600 cSt.

The main areas of application are:

- Central lubrication systems
- Oil circuit lubrication systems
- Transformers
- Cooling systems and circuits
- Lubrication circuits
- Hydraulic systems
- Pumps
- Welding machines and laser systems
- Chemical industry
- Research & development

### Medium:

- Oils / viscous fluids

### Special features:

- Accuracy  $\leq \pm 10\%$  FS
- Viscosity compensation from 30 .. 600 cSt
- Any mounting position
- High level of functional reliability
- High level of switching accuracy
- Stepless switch point setting by user
- High pressure resistance
- Threaded connection
- ATEX version also available for potentially explosive areas.

### Technical data:

#### Input data

Switching ranges [l/min]	Size 1	Size 2
	0.5 .. 1.6	0.5 .. 1.5
	0.8 .. 3.0	1 .. 4
	2.0 .. 7.0	2 .. 8
		3 .. 10
		5 .. 15
		8 .. 24
		10 .. 30
		15 .. 45
		20 .. 60
		30 .. 90
		35 .. 110

Operating pressure		
Brass version	300 bar	250 bar
Stainless steel version	350 bar	300 bar
Pressure drop [bar]	0.02 .. 0.2	0.02 .. 0.4
Mechanical connection	See dimensions	
Parts in contact with medium		
Brass version	Stainl. st. 1.4571; FPM <sup>1)</sup> ; Brass, (nickel-pl.); Brass; Hard ferrite	
Stainless steel version	Stainl. st. 1.4571; FPM <sup>1)</sup> ; Hard ferrite	

#### Output data

Switching outputs <sup>2)</sup>	1 or 2 reed contacts Change-over or N/O type	
Accuracy <sup>3)</sup>	$\leq \pm 10\%$ FS	
Repeatability	2 % FS max.	

#### Switching capacity

Change-over contact <sup>4)</sup>	max.	max.
Male connection EN175301-803 (DIN 43650)	250 V / 1.5 A / 50 VA	250 V / 1.5 A / 50 VA
Male connection M12x1	125 V / 1.5 A / 50 VA	250 V / 1.5 A / 50 VA
N/O contact	max.	max.
Male connection EN175301-803 (DIN 43650)	230 V / 3 A / 60 VA	250 V / 3 A / 100 VA
Male connection M12x1	125 V / 3 A / 60 VA	250 V / 3 A / 100 VA

#### Environmental conditions

Operating temperature range	-20 .. +70 °C
Fluid temperature range	
Male connection EN175301-803 (DIN 43650)	-20 .. +120 °C (optional -20 .. +160 °C)
Male connection M12x1	-20 .. +85 °C
Viscosity range	30 .. 600 cSt
CE mark	Directive 2006 / 95 / EC Directive 2004 / 108 / EC
Protection class to IEC 60529	IP 65

#### Other data

Housing material	Brass (nickel-pl.) or stainl. steel 1.4571
Electrical connection	Male connection EN175301-803 (DIN 43650) Male connection M12x1

Note: **FS (Full Scale)** = relative to the complete measuring range

<sup>1)</sup> Other seal materials available on request

<sup>2)</sup> The contact opens / switches when the flow falls below the pre-set switching point.

<sup>3)</sup> 3% possible when calibrated to a certain viscosity

<sup>4)</sup> Minimum load 3 VA

## Model code:

HFS 2 1 X X - XX - XXXX-XXXX - 7 - X - X - 000

### Measuring principle

2 = Variable area float

### Measuring medium

1 = Oils / viscous fluids

### Mechanical connection

4) 5)

1 = 1/4 "

2 = 3/8 "

3 = 1/2 "

4 = 3/4 "

5 = 1 "

### Electrical connection

5 = Male EN175301-803

(DIN 43650)

3 pole + PE,  
(connector supplied)

6 = Male M12x1, 4-pole

(connector not supplied)

### Switching contacts

6)

1S = 1 N/O contact

2S = 2 N/O contacts

1W = 1 Change-over contact

2W = 2 Change-over contacts

### Switching ranges in l/min

Oil 10 % -Size 1-

00.5-01.6; 00.8-03.0; 02.0-07.0

Oil 10 % -Size 2-

00.5-01.5; 0001-0004; 0002-0008; 0003-0010;

0005-0015; 0008-0024; 0010-0030; 0015-0045;

0020-0060; 0030-0090; 0035-0110

### Accuracy

7 =  $\pm 10.0$  % FS

### Housing material

B = Brass, nickel-plated

S = Stainless steel

### Mechanical indicator

0 = Without indicator

1 = With indicator

### Modification number

000 = Standard

4) Mechanical connection options depend on housing type (see Dimensions)

5) Other models available on request.

6) When the model with 2 switching contacts is selected, the second contact is fitted on the side of the instrument, at 90° to the first contact.

### Note:

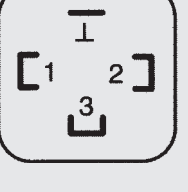
On instruments with a different modification number, please read the label or the technical amendment details supplied with the instrument.

### Accessories:

Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

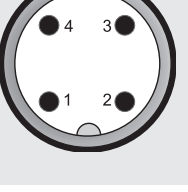
## Pin connections:

EN175301-803 (DIN 43650)



Pin	HFS 21X5-XS	HFS 21X5-XW
1	Centre	Centre
2	N/O contact	N/C contact
3	n.c.	N/O contact
⊥	Housing	Housing

M12x1



Pin	HFS 21X6-XS	HFS 21X6-XW
1	Centre	Centre
2	n.c.	N/C contact
3	n.c.	n.c.
4	N/O contact	N/O contact

### Notes on installation:

- The medium must not contain solid particles! We recommend using contamination strainers.
- External magnetic fields can affect the switching contact. Ensure sufficient distance from magnetic fields (e.g. from electric motors)!

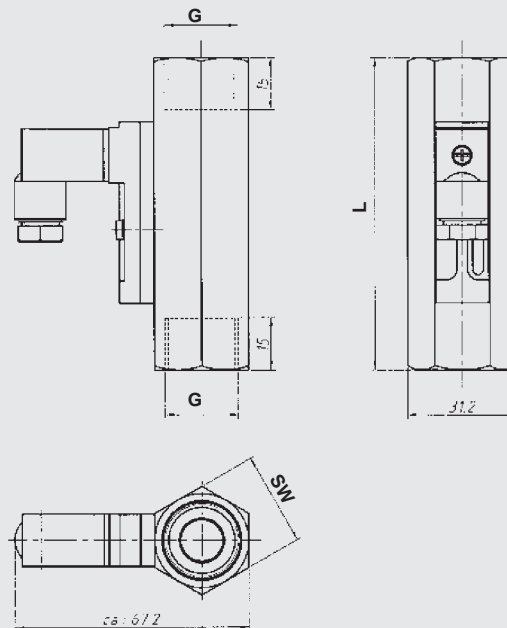


## Dimensions without indicator:

### OIL -Size 1- without indicator

Type [l/min]	Installation dimensions [mm]				Weight (approx.) [g]
	DN	SW	G	L	
0.5 .. 1.6	8	24	1/4"	98	400
	10	24	3/8"	108	450
	15	27	1/2" <sup>*)</sup>	90	350
0.8 .. 3.0	15	27	1/2"	90	350
2.0 .. 7.0					

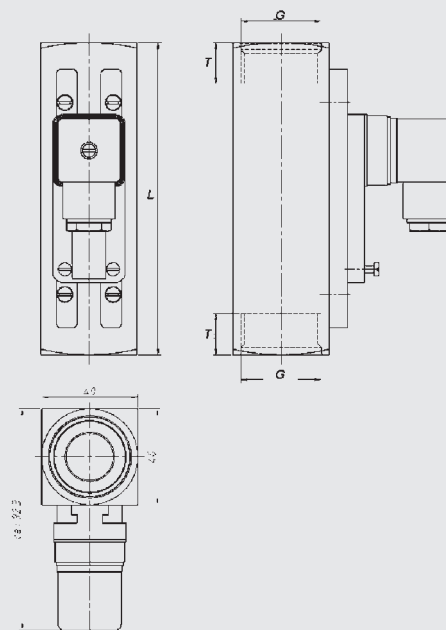
<sup>\*)</sup> Standard



### OIL -Size 2- without indicator

Type [l/min]	Installation dimensions [mm]					Weight (approx.) [g]
	DN	SW	G	L	T	
0.5 .. 1.5	8	34	1/4"	152	10	1500
	15	34	1/2"	152	14	1425
1 .. 4	20	34	3/4"	152	15	1340
	25	40	1" <sup>*)</sup>	130	17	1160
2 .. 8	15	34	1/2"	152	14	1425
3 .. 10						
5 .. 15						
8 .. 24	25	40	1" <sup>*)</sup>	130	17	1160
10 .. 30	20	34	3/4"	152	15	1340
15 .. 45						
20 .. 60						
30 .. 90	25	40	1"	130	17	1160
35 .. 110						

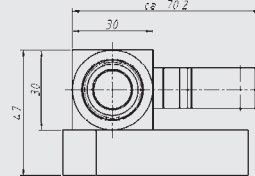
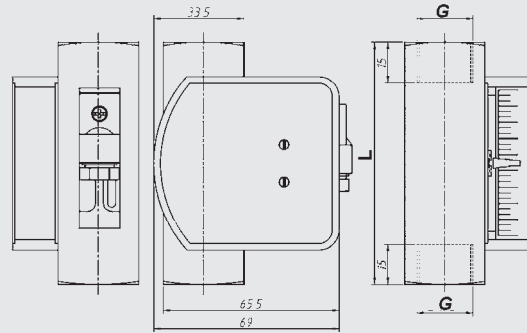
<sup>\*)</sup> Standard



## Dimensions with indicator:

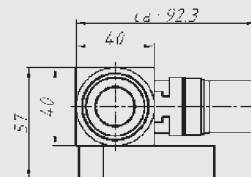
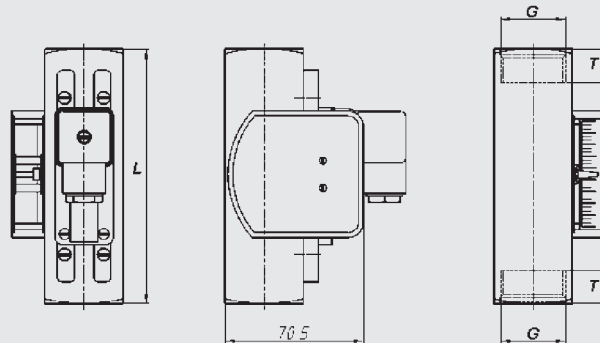
### OIL -Size 1- with indicator

Type [l/min]	Installation dimensions [mm]				Weight (approx.) [g]
	DN	SW	G	L	
0.5 .. 1.6	15	30	1/2"	90	570
0.8 .. 3.0					
2.0 .. 7.0					



### OIL -Size 2- with indicator

Type [l/min]	Installation dimensions [mm]					Weight (approx.) [g]
	DN	SW	G	L	T	
0.5 .. 1.5	8	34	1/4"	152	10	1590
	15	34	1/2"	152	14	1515
1 .. 4	20	34	3/4"	152	15	1430
	25	40	1" *)	130	17	1250
2 .. 8	15	34	1/2"	152	14	1515
3 .. 10						
5 .. 15						
8 .. 24	25	40	1" *)	130	17	1250
10 .. 30	20	34	3/4"	152	15	1430
15 .. 45						
20 .. 60						
30 .. 90	25	40	1"	130	17	1250
35 .. 110						



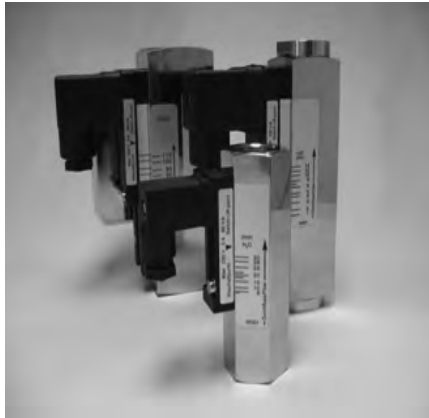
\*) Standard

## Note:

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

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## Electro-Mechanical Flow Switch HFS 2500 for Water or Water-Based Media

### Description:

The HYDAC Flow Switch in the series HFS 2500 is based on the variable area float principle. The test medium deflects a spring-loaded float in the direction of flow, depending on the flow rate. A reed contact is fitted to the outside of the instrument and is therefore separate from the flow circuit. When the magnet inside the float reaches the pre-set position, the reed contact will switch. To protect it from external influences, the switch is encapsulated in a casing designed to allow steplessly variable adjustment.

The instruments in the HFS 2500 series are available in two versions, with 5% accuracy and with 10% accuracy. Areas of application are to monitor flow rate in fluids (water / water-based) in the following areas, amongst others:

- Cooling systems and circuits
- Hydraulic systems
- Pumps
- Welding machines and laser systems
- Medical technology
- Pharmaceutical industry
- Chemical industry
- Research & development

### Fluid:

- Water / water-based media

### Special features:

- Accuracy  $\leq \pm 5\%$  or  $\leq \pm 10\%$  FS
- Any mounting position
- High level of function reliability
- High level of switching accuracy
- Stepless switch point setting by user
- High pressure resistance
- Threaded connection
- ATEX version also available for potentially explosive atmospheres

Note: **FS** (Full Scale) = relative to complete measuring range

1) Other seal materials available on request

2) The contact opens / switches when the flow falls below the pre-set switching point.

3) Minimum load 3 VA

### Technical data:

Input data				
Switching ranges [l/min]	5 % accuracy		10 % accuracy	
			Size 1	Size 2
0.2 .. 4.0	8 .. 90	0.005..0.06	0.02 .. 0.2	10 .. 30
0.6 .. 5.0	5 .. 110	0.04 .. 0.13	0.2 .. 0.6	15 .. 45
0.5 .. 8.0	10 .. 150	0.1 .. 0.6	0.4 .. 1.8	20 .. 60
1 .. 14	35 .. 220	0.2 .. 1.2	0.8 .. 3.2	30 .. 90
1 .. 28	35 .. 250	0.4 .. 2.0	2 .. 7	60 .. 150
2 .. 40		0.5 .. 3.0	3 .. 13	
4 .. 55		1.0 .. 5.0	4 .. 20	
1 .. 70			8 .. 30	
Operating pressure				
Brass version	200 bar	300 bar	300 bar	250 bar
Stainless steel version	300 bar	350 bar	350 bar	300 bar
Pressure drop [bar]	0.02 .. 0.8	0.02 .. 0.2	0.02 .. 0.3	0.02 .. 0.4
Mechanical connection	See dimensions			
Parts in contact with medium				
Brass version	Stainless steel 1.4571; NBR <sup>1)</sup> ; Brass; nickel-plated; Brass; Hard ferrite			
Stainless steel version	Stainless steel 1.4571; FPM <sup>1)</sup> ; Hard ferrite			
Output data				
Switching outputs <sup>2)</sup>	1 or 2 reed contacts Change-over or N/O type <sup>2)</sup>			
Accuracy	$\leq \pm 5\%$ or $\leq \pm 10\%$ FS			
Repeatability	2 % FS max.			
Switching capacity				
Change-over contact <sup>3)</sup>	max.	max.	max.	max.
Male connection	- 250 V	- 200 V	- 250 V	- 250 V
EN175301-803 (DIN 43650)	- 1.5 A	- 1 A	- 1.5 A	- 1.5 A
	- 50 VA	- 20 VA	- 50 VA	- 50 VA
Male connection M12x1	max.	max.	max.	max.
	- 250 V	- 125 V	- 125 V	- 250 V
	- 1.5 A	- 1 A	- 1.5 A	- 1.5 A
	- 50 VA	- 20 VA	- 50 VA	- 50 VA
N/O contact	max.	max.	max.	max.
Male connection	- 250 V	- 200 V	- 230 V	- 250 V
EN175301-803 (DIN 43650)	- 3 A	- 1 A	- 3 A	- 3 A
	- 100 VA	- 20 VA	- 60 VA	- 100 VA
Male connection M12x1	max.	max.	max.	max.
	- 250 V	- 125 V	- 125 V	- 250 V
	- 3 A	- 1 A	- 3 A	- 3 A
	- 100 VA	- 20 VA	- 60 VA	- 100 VA
Environmental Conditions				
Operating temperature range	-20 .. + 70 °C			
Fluid temperature range				
Male connection				
EN175301-803 (DIN 43650)	-20 .. +100 °C (optional -20 .. +160 °C)			
Male connection M12x1	-20 .. +85 °C			
CE mark				
Directive 2006 / 95 / EC				
Directive 2004 / 108 / EC				
Protection class to IEC 60529	IP 65			
Other data				
Housing material	Brass (nickel-plated) or stainless steel 1.4571			
Electrical connection	Male connection EN175301-803 (DIN 43650) Male connection M12x1			

## Model code:

HFS 2 5 X X - XX - XXXX-XXXX - X - X - X - 000

### Measuring principle

2 = Variable area float

### Test medium

5 = Water or water-based

### Mechanical connection

4)5)

1 = 1/4 "

2 = 3/8 "

3 = 1/2 "

4 = 3/4 "

5 = 1 "

6 = 1 1/4 "

7 = 1 1/2 "

### Electrical connection

5 = Male EN175301-803

(DIN 43650)

3 pole + PE

(connector supplied)

6 = Male M12x1, 4-pole

(connector not supplied)

### Switching contacts

1S = 1 N/O contact

2S = 2 N/O contacts

1W = 1 Change-over contact

2W = 2 Change-over contacts

### Switching ranges in l/min

Water 5 %

00.2-04.0; 00.6-05.0; 00.5-08.0;

01.0-0014; 01.0-0028; 02.0-0040; 04.0-0055;

01.0-0070; 08.0-0090; 0005-0110; 0010-0150;

0035-0220; 0035-0250;

### Water 10 % - Size 1 - (only available without mech. indicator)

.005-0.06; 0.04-0.13; 00.1-00.6; 00.2-01.2;

00.4-02.0; 00.5-03.0; 01.0-05.0

### Water 10 % - Size 2 -

0.02-00.2; 00.2-00.6; 00.4-01.8; 00.8-03.2;

02.0-07.0; 03.0-0013; 04.0-0020; 08.0-0030

### Water 10 % - Size 3 -

0010-0030; 0015-0045; 0020-0060;

0030-0090; 0060-0150

### Accuracy

6 =  $\leq \pm 5.0$  % FS

7 =  $\leq \pm 10.0$  % FS

### Housing material

B = Brass (nickel-plated)

S = Stainless steel

### Mechanical indicator

0 = Without indicator

1 = With indicator

### Modification number

000 = Standard

4) Mechanical connection options depend on housing type (see Dimensions)

5) Other models available on request.

6) When the model with 2 switching contacts is selected, the second contact is fitted on the side of the instrument at 90° to the first contact.

### Note:

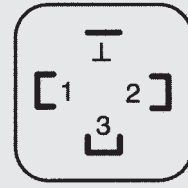
On instruments with a different modification number, please read the label or the technical amendment details supplied with the instrument.

### Accessories:

Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

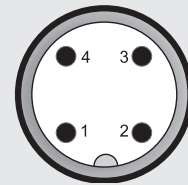
## Pin connections:

EN175301-803 (DIN 43650)



Pin	HFS 25X5-XS	HFS 25X5-XW
1	Centre	Centre
2	N/O contact	N/C contact
3	n.c.	N/O contact
⊥	Housing	Housing

M12x1



Pin	HFS 25X6-XS	HFS 25X6-XW
1	Centre	Centre
2	n.c.	N/C contact
3	n.c.	n.c.
4	N/O contact	N/O contact

## Notes on installation:

- The medium must not contain solid particles! We recommend using contamination strainers.
- External magnetic fields can affect the switching contact. Ensure sufficient distance from magnetic fields (e.g. from electric motors)!

## Dimensions without indicator:

Type [l/min]	Installation dimensions [mm]							Weight (approx.) [g]
	SW	D	B	G	DN	T	L	

### Water 5 % Accuracy

0.2 .. 4.0	27	30	86	1/4" 3/8" 1/2"	8 10 15	14	130	850
0.6 .. 5.0								
0.5 .. 8.0								
1 .. 14								
1 .. 28	27	30	86	1/2" 3/4"	15 20	14 16	148 174	900
2 .. 40								
4 .. 55								
1 .. 70	34 40	40 40	96 96	3/4" 1"	20 25	18 19	152 156	1400 1100
8 .. 90								
5 .. 110								
10 .. 150	50	50	101	1 1/4"	32	21	200	2750
35 .. 220	50	50	106	1 1/4"	32	21	200	3000
35 .. 250	60	50	107	1 1/2"	40	24	200	3800

### Water 10 % Accuracy - Size 1-

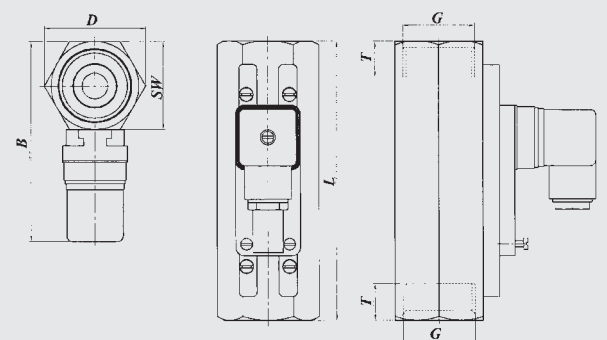
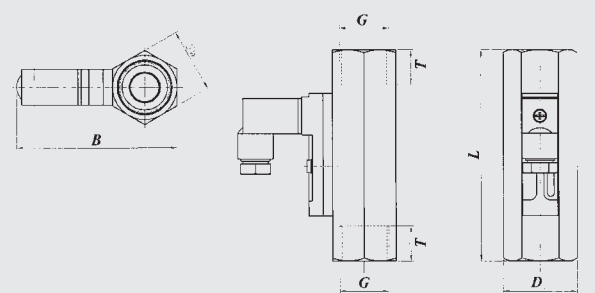
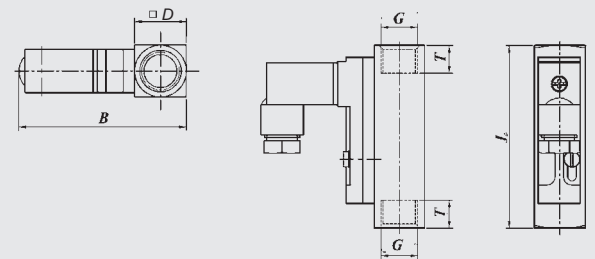
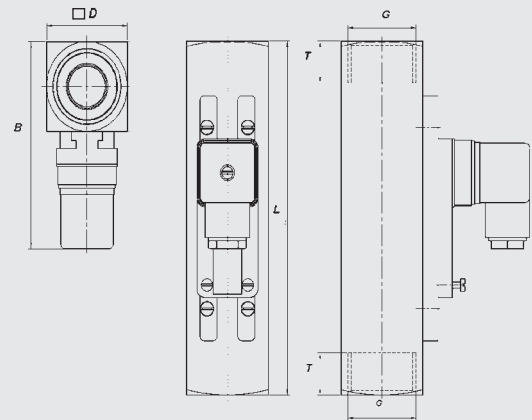
0.005..0.06	17	18	56	1/4"	8	10	65	140
0.04..0.13								
0.1..0.6								
0.2..1.2								
0.4..2.0								
0.5..3.0								
1.0..5.0								

### Water 10 % Accuracy - Size 2 -

0.02 .. 0.2	27	31	67	1/2 "	15	15	90	350
0.2 .. 0.6								
0.4 .. 1.8								
0.8 .. 3.2								
2.0 .. 7.0								
3.0 .. 13.0								
4.0 .. 20.0								
8.0 .. 30.0								

### Water 10 % Accuracy - Size 3 -

10 .. 30	41	47	93	3/4 " 1" *)	20 25	21 17	152 130	1200 1050
15 .. 45								
20 .. 60								
30 .. 90								
60 .. 150	41	47	93	1"	25	17	130	1050



\*) Standard

## Dimensions with indicator:

Type [l/min]	Installation dimensions [mm]							Weight (approx.) [g]
	SW	D	B	G	DN	T	L	

### Water 5 % Accuracy

0.2 .. 4.0	27	30	86	1/4" 3/8" 1/2"	8 10 15	14	130	940
0.6 .. 5.0								
0.5 .. 8.0								
1 .. 14								
1 .. 28	27	30	86	1/2" 3/4"	15 20	14 16	148 174	990
2 .. 40								
4 .. 55	34 40	40 40	96 96	3/4" 1"	20 25	18 19	152 156	1490 1190
1 .. 70								
8 .. 90								
5 .. 110	50	50	101	1 1/4"	32	21	200	2840
10 .. 150								
35 .. 220	50	50	106	1 1/4"	32	21	200	3090
35 .. 250	60	50	107	1 1/2"	40	24	200	3890

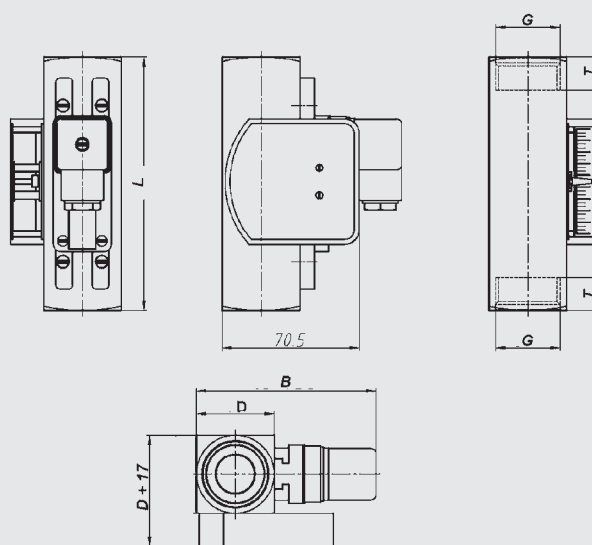
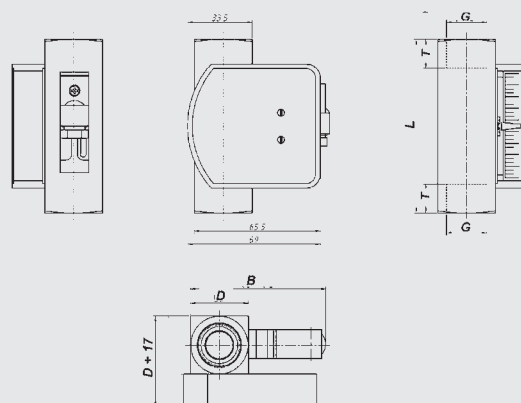
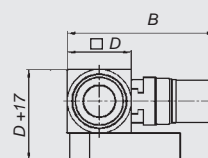
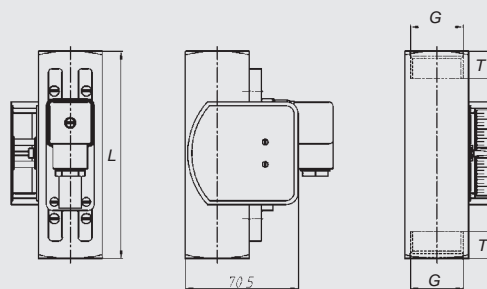
### Water 10 % Accuracy - Size 2-

0.02 .. 0.2	30	30	70	1/2"	15	15	90	570
0.2 .. 0.6								
0.4 .. 1.8								
0.8 .. 3.2								
2.0 .. 7.0								
3.0 .. 13.0								
4.0 .. 20.0								
8.0 .. 30.0								

### Water 10 % Accuracy - Size 3 -

10 .. 30	41	47	93	3/4" 1" *)	20 25	21 17	152 130	1430 1250
15 .. 45								
20 .. 60								
30 .. 90								
60 .. 150	41	47	93	1"	25	17	130	1250

\*) Standard



## 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 ELECTRONICS

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## Electronic Flow Transmitter HFT 2100 for Oils / Viscous Fluids

### Description:

The HFT 2100 series of HYDAC flow transmitters is based on the variable area float principle.

Irrespective of the installation position, the test medium deflects a spring-loaded float in the direction of flow, depending on the flow rate.

A Hall sensor which detects the position of the float, is fitted to the outside of the instrument and is therefore separate to the flow circuit.

In proportion to the deflection of the float, the sensor produces an analogue signal which corresponds to the particular measuring range.

The device is calibrated for vertical installation and for an upwards flow direction. The transmitter is designed to give reliable measurements within its accuracy range, even with changes in viscosity. The kinematic viscosity may vary between 30 and 600 cSt.

The areas of application include:

- Central lubrication systems
- Oil circuit lubrication systems
- Transformers
- Cooling systems and circuits
- Lubrication circuits
- Hydraulic systems
- Pumps
- Welding machines and laser systems
- Chemical industry
- Research & development

### Medium:

- Oils / viscous fluids

### Special features:

- Accuracy  $\leq \pm 10\%$  FS
- Viscosity compensation from 30 .. 600 cSt
- Any mounting position
- High level of functional reliability
- High pressure resistance
- Threaded connection

### Technical data:

#### Input data

Measuring ranges [l/min]	Size 1	Size 2
	0.5 .. 1.6	0.5 .. 1.5
	0.8 .. 3.0	1 .. 4
	2.0 .. 7.0	2 .. 8
		3 .. 10
		5 .. 15
		8 .. 24
		10 .. 30
		15 .. 45
		20 .. 60
		30 .. 90
		35 .. 110

Operating pressure		
Brass version	300 bar	250 bar
Stainless steel version	350 bar	300 bar
Pressure drop [bar]	0.02 .. 0.2	0.02 .. 0.4
Mechanical connection	See dimensions	
Parts in contact with medium		
Brass version	Stainl. st. 1.4571; FPM <sup>1)</sup> ; Brass, nickel-plated; Brass; Hard ferrite	
Stainless steel version	Stainl. st. 1.4571; FPM <sup>1)</sup> ; Hard ferrite	

#### Output data

Output signal	4 .. 20 mA, 3 conductor
	0 .. 10 V, 3 conductor
Accuracy <sup>2)</sup>	$\leq \pm 10\%$ FS
Repeatability	1 % FS max.

#### Environmental conditions

Operating temperature range	-20 .. +70 °C
Fluid temperature range	-20 .. +70 °C
Viscosity range	30 .. 600 cSt
CE mark	Directive 2004 / 108 / EC
Protection class to IEC 60529	IP 67

#### Other data

Supply voltage	18 .. 30 V
Power consumption	< 1 W
Electrical connection	Male connection M12x1
Housing material	
Measuring body	Brass (nickel-plated) or st. steel 1.4571
Transmitter	Brass (nickel-plated)

Note: **FS (Full Scale)** = relative to the complete measuring range

<sup>1)</sup> Other seal materials available on request

<sup>2)</sup> 3 % possible with calibration to a certain viscosity

## Model code:

HFT 2 1 X 6 - X - XXXX-XXXX - 7 - X - 0 - 000

### Measuring principle

2 = Variable area float

### Measuring medium

1 = Oils / viscous fluids

### Mechanical connection

<sup>2) 3)</sup>

1 = 1/4 "

2 = 3/8 "

3 = 1/2 "

4 = 3/4 "

5 = 1 "

### Electrical connection

6 = Male M12x1, 4 pole  
(connector not supplied)

### Output signal

B = 0 .. 10 V, 3 conductor

C = 4 .. 20 mA, 3 conductor

### Measuring ranges in l/min <sup>3)</sup>

#### Oil 10 % - Size 1 -

00.5-01.6; 00.8-03.0; 02.0-07.0

#### Oil 10 % -Size 2-

00.5-01.5; 0001-0004; 0002-0008; 0003-0010;  
0005-0015; 0008-0024; 0010-0030; 0015-0045;  
0020-0060; 0030-0090; 0035-0110

### Accuracy

7 =  $\leq \pm 10.0$  % FS

### Housing material

B = Brass, nickel-plated

S = Stainless steel

### Mechanical indicator

0 = Without indicator

### Modification number

000 = Standard

2) Mechanical connection options depend on housing type  
(see Dimensions)

3) Other models available on request.

### Note:

Special models on request.

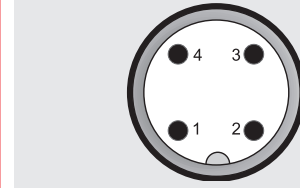
On instruments with a different modification number, please read the label or the technical amendment details supplied with the instrument.

### Accessories:

Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

## Pin connections:

M12x1



Pin	HFT 21X6-C	HFT 21X6-B
1	+U <sub>B</sub>	+U <sub>B</sub>
2	reserved	reserved
3	GND	GND
4	4 .. 20 mA	0 .. 10 V

### Notes on installation:

- The medium must not contain solid particles! We recommend using contamination strainers.
- External magnetic fields can affect the switching contact. Ensure sufficient distance from magnetic fields (e.g. from electric motors)!

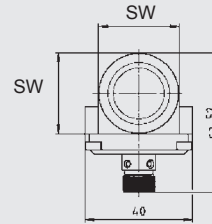
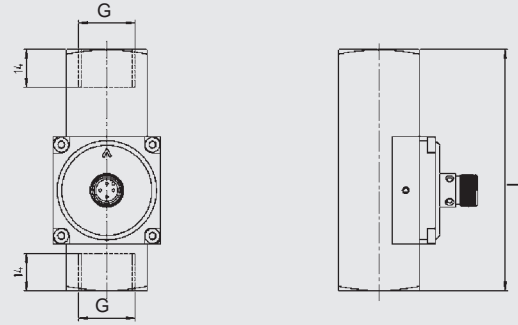


## Dimensions:

### Size 1

Type [l/min]	Installation dimensions [mm]				Weight (approx.) [g]
	DN	SW	G	L	
0.5 .. 1.6	8	24	1/4"	98	610
	10	24	3/8"	119	660
	15	30	1/2" <sup>*)</sup>	90	560
0.8 .. 3.0	15	30	1/2"	90	560
2.0 .. 7.0					

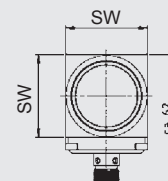
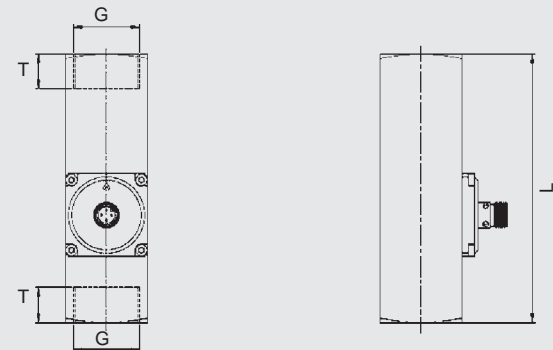
<sup>\*)</sup> Standard



### Size 2

Type [l/min]	Installation dimensions [mm]					Weight (approx.) [g]
	DN	SW	G	L	T	
0.5 .. 1.5	8	34	1/4"	152	10	1510
	15	34	1/2"	152	14	1435
1 .. 4	20	34	3/4"	152	15	1350
	25	40	1" <sup>*)</sup>	130	17	1170
2 .. 8	15	34	1/2"	152	14	1435
3 .. 10						
5 .. 15						
8 .. 24	25	40	1" <sup>*)</sup>	130	17	1170
10 .. 30	20	34	3/4"	152	15	1350
15 .. 45						
20 .. 60						
30 .. 90	25	40	1"	130	17	1170
35 .. 110						

<sup>\*)</sup> Standard



## Note:

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

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## Electronic Flow Transmitter HFT 2500 for water / water-based media

### Description:

The HFT 2500 series of HYDAC flow transmitters is based on the variable area float principle and is position-independent.

The test medium deflects a spring-loaded float in the direction of flow, depending on the flow rate but irrespective of the installation position. A Hall sensor is fitted to the outside of the device and is therefore also outside the flow circuit. It determines the position of the float.

The sensor emits an analogue signal proportional to the deflection of the float which corresponds to the relevant measurement range.

The device is calibrated for vertical installation and for a flow direction from bottom to top.

Areas of application are to monitor flow rate in fluids (water / water-based) in the following areas, amongst others:

- Cooling systems and circuits
- Hydraulic systems
- Pumps
- Welding machines and laser systems
- Medical technology
- Pharmaceutical industry
- Chemical industry
- Research & development

### Medium:

- Water or water-based media

### Special features:

- Accuracy  $\leq \pm 3\%$  FS
- Any mounting position
- High level of functional reliability
- High pressure resistance
- Threaded connection

### Technical data:

Input data					
Measuring ranges [l/min]	Size 1	Size 2	Size 3	Size 4	
0.005..0.06		0.02 .. 0.2	10 .. 30	0.2 .. 4.0	8 .. 90
0.04 .. 0.13		0.2 .. 0.6	15 .. 45	0.6 .. 5.0	5 .. 110
0.1 .. 0.6		0.4 .. 1.8	20 .. 60	0.5 .. 8.0	10 .. 150
0.2 .. 1.2		0.8 .. 3.2	30 .. 90	1 .. 14	35 .. 220
0.4 .. 2.0		2 .. 7	60 .. 150	1 .. 28	35 .. 250
0.5 .. 3.0		3 .. 13		2 .. 40	
1.0 .. 5.0		4 .. 20		4 .. 55	
		8 .. 30		1 .. 70	
Operating pressure					
Brass version	300 bar	300 bar	250 bar	200 bar	
Stainless steel version	350 bar	350 bar	300 bar	300 bar	
Pressure drop [bar]	0.02 .. 0.2	0.02 .. 0.3	0.02 .. 0.4	0.02 .. 0.8	
Mechanical connection	See dimensions				
Parts in contact with medium					
Brass version	Stainl. steel 1.4571; NBR <sup>1)</sup> ; Brass (nickel-pl.); Brass; Hard ferrite				
Stainless steel version	Stainless steel 1.4571; FPM <sup>1)</sup> ; Hard ferrite				
Output data					
Output signal	4 .. 20 mA, 3-conductor 0 .. 10 V, 3-conductor				
Accuracy	$\leq \pm 3\%$ FS				
Repeatability	1 % FS				
Environmental conditions					
Operating temperature range	-20 .. +70 °C				
Fluid temperature range	-20 .. +70 °C				
CE mark	Directive 2004 / 108 / EC				
Protection class to IEC 60529	IP 67				
Other data					
Supply voltage	18 .. 30 V DC				
Power consumption	< 1 W				
Housing material					
Measuring body	Brass (nickel-plated) or stainless steel 1.4571				
Transmitter	Brass (nickel-plated)				
Electrical connection	Male connection M12x1				

Note: FS (Full Scale) = relative to the complete measuring range  
1) Other seal materials available on request

## Model code:

HFT 2 5 X 6 – X – XXXX–XXXX – 5 – X – 0 – 000

### Measuring principle

2 = Variable area float

### Test medium

5 = Water /  
water-based

### Mechanical connection <sup>2)</sup>

1 = 1/4 "  
2 = 3/8 "  
3 = 1/2 "  
4 = 3/4 "  
5 = 1 "  
6 = 1 1/4 "  
7 = 1 1/2 "

### Electrical connection

6 = Male M12x1, 4 pole  
(connector not supplied)

### Output signal

B = 0 .. 10 V, 3 conductor  
C = 4 .. 20 mA, 3 conductor

### Measuring ranges in l/min

#### Size 1

.005-0.06; 0.04-0.13; 0.1-0.6; 0.2-0.12; 0.4-0.20;  
0.5-0.30; 0.1-0.50

#### Size 2

0.02-0.2; 0.2-0.6; 0.4-1.8; 0.8-3.2; 0.2-0.70;  
0.3-0.13; 0.4-0.20; 0.8-0.30

#### Size 3

0.010-0.030; 0.015-0.045; 0.020-0.060; 0.030-0.090; 0.060-0.150

#### Size 4

0.2-0.40; 0.6-0.50; 0.5-0.80; 0.1-0.014; 0.1-0.028;  
0.2-0.040; 0.4-0.055;  
0.1-0.070; 0.8-0.090; 0.005-0.110; 0.010-0.150;  
0.035-0.220; 0.035-0.250

### Accuracy

5 =  $\leq \pm 3.0\%$  FS

### Housing material

B = Brass (nickel-plated)  
S = Stainless steel

### Mechanical indicator

0 = Without indicator

### Modification number

000 = Standard

2) Mechanical connection options depend on housing type  
(see Dimensions)

### Note:

Special models on request.

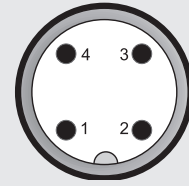
On instruments with a different modification number, please read the label or the technical amendment details supplied with the instrument.

### Accessories:

Appropriate accessories, such as electrical connectors, can be found in the Accessories brochure.

## Pin connections:

M12x1



Pin	HFT 25X6-C	HFT 25X6-B
1	+U <sub>B</sub>	+U <sub>B</sub>
2	reserved	reserved
3	GND	GND
4	4 ..20 mA	0 ..10 V

## Notes on installation:

- The medium must not contain solid particles! We recommend using contamination strainers.
- External magnetic fields can affect the switching contact. Ensure sufficient distance from magnetic fields (e.g. from electric motors)!

## Dimensions:

Type [l/min]	Installation dimensions							Weight (approx.) [g]
	[mm]							
	SW	D	B	G	DN	T	L	

### Size 1

0.005..0.06	17	18	39	1/4"	8	10	65	210
0.04..0.13								
0.1..0.6								
0.2..1.2								
0.4..2.0								
0.5..3.0								
1.0..5.0								

### Size 2

0.02 .. 0.2	30	30	62	1/2 "	15	14	90	560
0.2 .. 0.6								
0.4 .. 1.8								
0.8 .. 3.2								
2.0 .. 7.0								
3.0 .. 13.0								
4.0 .. 20.0								
8.0 .. 30.0								

### Size 3

10 .. 30	34 40	40	62	3/4 " 1" *)	20 25	15 17	152 130	1200 1050
15 .. 45								
20 .. 60								
30 .. 90								
60 .. 150	40	40	62	1"	25	17	130	1050

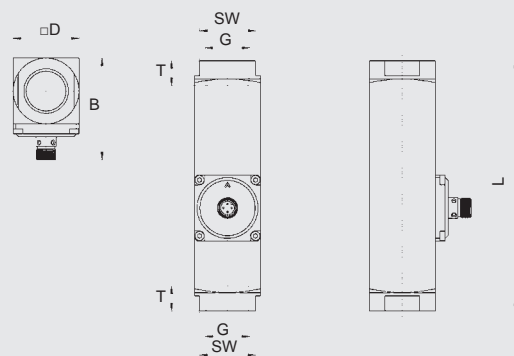
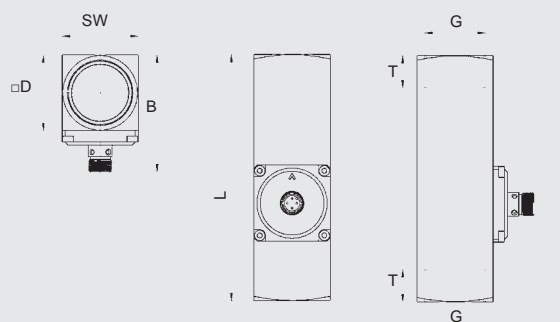
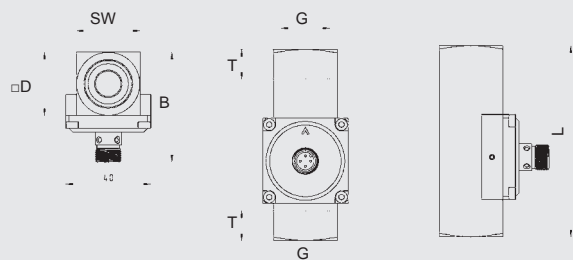
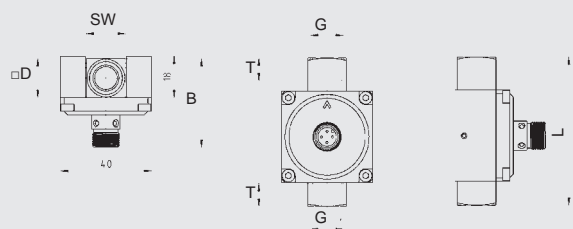
### Size 4

0.2 .. 4.0	27	40	52	1/4" 3/8" 1/2"	8 10 15	14	131	900
0.6 .. 5.0								
0.5 .. 8.0								
1 .. 14								
1 .. 28	27 32	40	52	1/2" 3/4"	15 20	14 16	146 174	950
2 .. 40								
4 .. 55	34 40	40 40	62 62	3/4" 1"	20 25	18 19	152 156	1420 1120
1 .. 70								
8 .. 90								
5 .. 110	50	50	72	1 1/4"	32	21	200	2770
10 .. 150								
35 .. 220								
35 .. 250	60	50	72	1 1/2"	40	24	200	3820

\*) Standard

### Note:

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



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