HYDAD INTERNATIONAL

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	K EVS 3110	K EVS 3100	JA HFS 2100	HFS 2500	📌 HFT 2100	🦛 нғт 2500
Accuracy (max. error)	2	2	10	5	10	3
Pressure-resistant	✓	✓	✓	✓	✓	✓
Water-based media	✓			\checkmark		✓
Oil / viscous fluids		\checkmark	✓		✓	
Direction of flow optional	✓	\checkmark				
Installation position optional	✓	✓	✓	✓	✓	✓
Max. number of switching contacts			2	2		
Analog output	✓	✓			✓	✓
Display			✓	✓		
ATEX Intrinsically safe			✓	\checkmark		

Note:

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

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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

Electronic Flow Rate Transmitter EVS 3110 for Water-Based Fluids

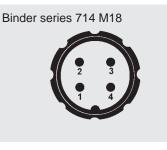
Technical data:

rechnical data:		
Input data		
Measuring ranges ¹⁾ 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 threa or temperature senso	•
Output data		
Output signal, permitted load resistance		0 V) / 20 mA [kΩ]
Accuracy	\leq 2 % of the actual va	alue
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	
(f mark	EN 61000-6-1 / 2 / 3 /	
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 ²⁾	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 5.2 ~ 2100 g (1.59 15 ~ 3320 g (3.96 79 ~ 3500 g (10.6 159	.9 gpm) .3 gpm)

Note: ¹⁾ Other measuring ranges on request ²⁾ Other fluids on request

Model code:
EVS 3 1 1 X - A - <u>XXXX</u> - <u>000</u>
Housing material
Electrical connection 4 = Male 4 pole Binder series 714 M18 (connector not supplied)
6 = Male M12x1, 4 pole (connector not supplied)
Signal $\overline{A} = 4 20 \text{ mA}, 2 \text{ conductor}$
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:



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

male electr. conn.

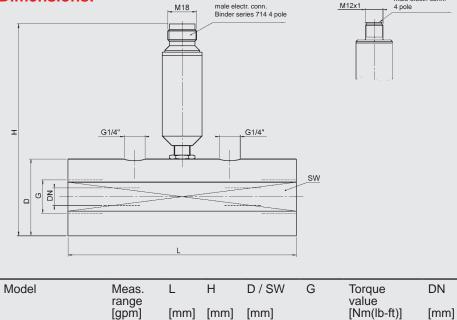
7

11

22

30

Dimensions:



135

135

150

150

47 / 46

48.5 / 46

63.5 / 60

63.5 / 60

G¼"

G1⁄2"

G1¼"

G1½"

60(44)

130(95)

500(370)

600(440)

No	te:

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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EVS 311X-A-0020 0.26 .. 5.28 117

EVS 311X-A-0060

EVS 311X-A-0300

EVS 311X-A-0600

1.59 .. 15.9 144

3.96 .. 79.3 155

10.6 .. 159 181

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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

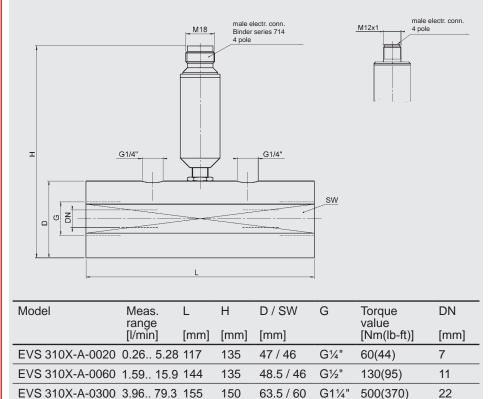
Electronic Flow Rate Transmitter EVS 3100 for Oils / Viscous Fluids

Technical data:

Technical uala.			
Input data			
Measuring ranges ¹⁾ 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 threa	ads for pressure and/	
	or temperature sense	ors	
Output data			
Output signal, permitted load resistance	4 20 mA, 2 conduc		
		0 V) / 20 mA [kΩ]	
Accuracy	\leq 2 % of the actual va	alue	
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		
(E mark	EN 61000-6-1 / 2 / 3		
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 ²⁾	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 5.2		
	~ 860 g (1.59 15		
	~ 1410 g (3.96 79		
	~ 1530 g (10.6 159	9 gpm)	

Note: ¹⁾ Other measuring ranges on request ²⁾ Other fluids on request

Model code:	
EVS 3 1 0 X – A – <u>XXXX</u> -	- <u>000</u>
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.	
Dimensions:	



150

G1½"

600(440)

63.5 / 60

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

Note:

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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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EVS 310X-A-0600 10.6.. 159 181

GYDAD INTERNATIONAL



Description:

The HYDAC flow switches of the HFS 2100 series are based on a variable area float principle and are positionindependent. 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 ≤ ± 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.

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

Technical data:

0.51.6 0.51.5 0.83.0 14 2.07.0 28 310 310 515 824 1030 1545 207.0 208 11030 1545 2060 3090 35110 35110 Operating pressure 300 bar 250 bar 300 bar 350 and90 3090 35110 0.020.2 Mechanical connection See dimensions Parts in contact with medium Stainless steel version Stainless steel version Stainl. st. 1.4571; FPM ¹ ; Brass, (nickel-pl.); Brass; Hard ferrite Output data 50	Switching ranges [I/min]	Size 1	Size 2	
2.07.0283105155158241030154520603090351102060Qperating pressure Brass version300 barStainless steel version300 bar9035110Operating constructionSee dimensionsPressure drop [bar]0.020.20.020.4Mechanical connectionSee dimensionsParts in contact with medium Brass versionBrass versionStainl. st. 1.4571; FPM ¹); Brass, (nickel-pl.); Brass; Hard ferriteOutput dataSwitching outputs ²⁰ 1 or 2 reed contacts Change-over or N/O typeAccuracy ³⁰ $\leq \pm 10$ % FSRepeatability2 % FS max.Switching capacitymax.Change-over contact 40 Male connection M12x1max.Male connection M12x1125 V / 1.5 A / 50 VA 250 V / 3 A / 100 V 250 V / 3 A / 100 VCherrent cancel in M12x1-20 +120 °C -20 +18° °C Directive 2006 / 95 / EC Directive 2006 / 108 / ECProtection class to IEC 60529IP 65Other dataBrass (nickel-pl.) or sta		0.5 1.6	0.5 1.5	
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Brass version300 bar250 barStainless steel version350 bar300 barPressure drop [bar]0.02 0.20.02 0.4Mechanical connectionSee dimensionsParts in contact with mediumBrass versionStainl. st. 1.4571; FPM ¹); Brass, (nickel-pl.); Brass; Hard ferriteStainless steel versionStainl. st. 1.4571; FPM ¹); Brass, (nickel-pl.); Brass; Hard ferriteOutput dataSwitching outputs ²⁰ 1 or 2 reed contacts Change-over or N/O typeAccuracy ³⁰ ≤ ± 10 % FSRepeatability2 % FS max.Switching capacityChange-over contact ⁴⁰ Male connection M12x1Male connection M12x1Male connection M12x1Male connection M12x1Male connection M12x1Male connection M12x1Perating temperature range Fluid temperature rangePiloid temperature rangeMale connection M12x1Connection M12x1	Operating pressure			
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Mechanical connectionSee dimensionsParts in contact with mediumBrass versionStainl. st. 1.4571; FPM ¹); Brass, (nickel-pl.); Brass; Hard ferriteStainless steel versionStainl. st. 1.4571; FPM ¹); Hard ferriteOutput dataSwitching outputs ² 1 or 2 reed contacts Change-over or N/O typeAccuracy ³) $\leq \pm 10 \%$ FSRepeatability2 % FS max.Switching capacityChange-over contact ⁴)Male connection EN175301-803 (DIN 43650)N/O contactMale connection EN175301-803 (DIN 43650)Male connection EN175301-803 (DIN 43650)Male connection M12x1Male connection M12x1Male connection M12x1CorrectMale connection EN175301-803 (DIN 43650)Male connection M12x1CorrectMale connection M12x1CorrectMale connection M12x1CorrectProtection EN175301-803 (DIN 43650)CorrectMale connection M12x1CorrectCorrection EN175301-803 (DIN 43650)Correction EN175301-803 (DIN 43650)Correction Correction M12x1Correction EN175301-803 (DIN 43650)Correction Correction M12x1Correction EN175301-803 (DIN 43650)Correction Correction EN175301-803 (DIN 43650)Correction EN175301-803 (DIN 43650)Correction Correction EN175301-803 (DIN 43650)Correction Correction EN175301-803 (DIN 43650)Correction Correction EN175301-803 (DIN 43650)Correction Class to IEC 60529IP 65	Stainless steel version	350 bar		
Mechanical connectionSee dimensionsParts in contact with mediumStainl. st. 1.4571; FPM ¹); Brass, (nickel-pl.); Brass; Hard ferriteBrass versionStainl. st. 1.4571; FPM ¹); Brass, (nickel-pl.); Brass; Hard ferriteStainless steel versionStainl. st. 1.4571; FPM ¹); Hard ferriteOutput dataSwitching outputs ² 1 or 2 reed contacts Change-over or N/O typeAccuracy ³) $\leq \pm 10 \%$ FSRepeatability2 % FS max.Switching capacityChange-over contact ⁴)Male connection EN175301-803 (DIN 43650)max. 250 V / 1.5 A / 50 VA 250 V / 3 A / 100	Pressure drop [bar]	0.02 0.2	0.02 0.4	
Brass versionStainl. st. 1.4571; FPM 1 ; Brass, (nickel-pl.); Brass; Hard ferriteStainless steel versionStainl. st. 1.4571; FPM 1 ; Hard ferriteOutput dataTor 2 reed contacts Change-over or N/O typeSwitching outputs ²⁰ 1 or 2 reed contacts Change-over or N/O typeAccuracy ³⁰ $\leq \pm 10 \%$ FSRepeatability2 % FS max.Switching capacitymax. 250 V / 1.5 A / 50 VA 250 V / 1.5 A / 100 VA 250 V / 1.5 A / 100 VA 250 V / 3 A / 10	Mechanical connection	See dimensions		
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Change-over or N/O typeAccuracy ³⁾ $\leq \pm 10 \%$ FSRepeatability2 % FS max.Switching capacitymax.Change-over contact 4)max.Male connection EN175301-803 (DIN 43650)250 V / 1.5 A / 50 VAMale connection M12x1125 V / 1.5 A / 50 VAN/O contactmax.Male connection EN175301-803 (DIN 43650)230 V / 3 A / 60 VAMale connection EN175301-803 (DIN 43650)230 V / 3 A / 60 VAMale connection M12x1125 V / 3 A / 60 VAEnvironmental conditions230 V / 3 A / 60 VAOperating temperature range-20 +70 °CFluid temperature range-20 +70 °CFluid temperature range-20 +70 °CMale connection M12x1-20 +85 °CViscosity range30 600 cStImarkDirective 2006 / 95 / ECDirective 2006 / 95 / ECDirective 2004 / 108 / ECProtection class to IEC 60529IP 65Other dataBrass (nickel-pl.) or stainl. steel 1.4571Electrical connectionMale connection EN175301-803(DIN 43650)Male connection EN175301-803				
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Male connection M12x1 $125 \vee / 1.5 \wedge / 50 \vee A$ $250 \vee / 1.5 \wedge / 50 \vee A$ N/O contactmax.max.Male connection EN175301-803 (DIN 43650) $230 \vee / 3 \wedge / 60 \vee A$ $250 \vee / 3 \wedge / 100 \vee A$ Male connection M12x1 $125 \vee / 3 \wedge / 60 \vee A$ $250 \vee / 3 \wedge / 100 \vee A$ Environmental conditions $250 \vee / 3 \wedge / 100 \vee A$ Operating temperature range $-20 \dots +70 \degree C$ Fluid temperature range $-20 \dots +70 \degree C$ Male connection EN175301-803 (DIN 43650) $-20 \dots +120 \degree C$ (optional $-20 \dots +160 \degree C$)Male connection M12x1 $-20 \dots +85 \degree C$ Viscosity range $30 \dots 600 \degree CSt$ Viscosity range $30 \dots 600 \degree CSt$ Directive 2006 / 95 / ECDirective 2004 / 108 / ECProtection class to IEC 60529IP 65Other dataHousing materialHousing materialBrass (nickel-pl.) or stainl. steel 1.4571Electrical connectionMale connection EN175301-803 (DIN 43650)				
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Other data Housing material Brass (nickel-pl.) or stainl. steel 1.4571 Electrical connection Male connection EN175301-803 (DIN 43650)	Protection class to IEC 60529	IP 65	-	
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Electrical connection Male connection EN175301-803 (DIN 43650)		Brass (nickel-pl.) or st	tainl. steel 1.4571	
(DIN 43650)		,		
			x1	

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

³⁾ 3% possible when calibrated to a certain viscosity

⁴⁾ Minimum load 3 VA

Model code:
HFS 21XX- <u>XX</u> - <u>XXX-XXXX</u> -7-X-X- <u>000</u>
Measuring principle → 2 = Variable area float
Measuring medium
1 = Oils / viscous fluids
Mechanical
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 I/min ⁵ 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
$7 = \le \pm 10.0 \% \text{ FS}$
Housing material
B = Brass, nickel-plated S = Stainless steel
Mechanical indicator
0 = Without indicator
1 = With indicator
Modification number
 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
Т	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)!

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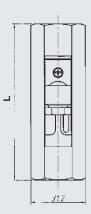
Dimensions without indicator:

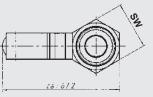
Type [l/min]		Installation dimensions [mm]			Weight (approx.) [g]
	DN	SW	G	L	
0.5 1.6	8 10 15	24 24 27	1/4" 3/8" 1/2" ^{*)}	98 108 90	400 450 350
0.8 3.0 2.0 7.0	15	27	1/2"	90	350

OIL -Size 1- without indicator

*) Standard

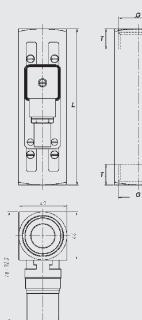






OIL -Size 2- without indicator						
Type [l/min]	Installation dimensions [mm]					Weight (approx.) [g]
	DN	SW	G	L	Т	
0.5 1.5	8 15	34 34	1/4" 1/2"	152 152	10 14	1500 1425
14	20 25	34 40	3/4" 1" ^{*)}	152 130	15 17	1340 1160
28						
3 10	15	34 34	1/2" 3/4"	152	14 15	1425 1340
5 15	20 25	40	3/4 1" ^{*)}	152 130	17	1160
8 24						
10 30						
15 45	20 25	34 40	3/4" 1" ^{*)}	152 130	15 17	1340 1160
20 60				100		1100
30 90	25	40	1"	120	17	1160
35 110	25	40	1	130	17	1160

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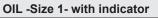


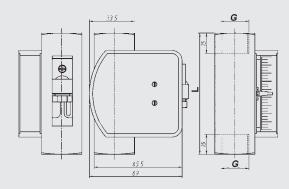
*) Standard

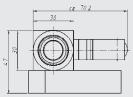
US 18.379.1/10.17

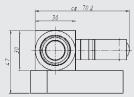
Dimensions with indicator:

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



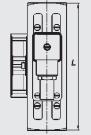


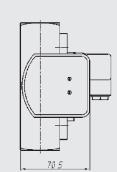


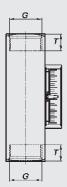


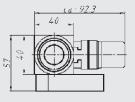
OIL -Size 2- with indicator

Type [l/min]		lation nsions	Weight (approx.) [g]			
	DN	SW	G	L	Т	
0.5 1.5	8 15	34 34	1/4" 1/2"	152 152	10 14	1590 1515
14	20 25	34 40	3/4" 1" ^{*)}	152 130	15 17	1430 1250
28						
3 10	15	34	1/2"	152	14	1515
5 15	20 25	34 40	3/4" 1" ^{*)}	152 130	15 17	1430 1250
8 24]					
10 30						
15 45	20 25	34 40	3/4" 1" ^{*)}	152 130	15 17	1430 1250
20 60					. /	
30 90	25	40	1"	130	17	1250
35 110	25	40		130	17	1200









*) Standard

Note:

US 18.379.1/10.17

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.

HYDAC ELECTRONICS 90 Southland Dr. Bethlehem, PA 18017 Telephone +1 (610) 266-0100 E-mail: electronics@hydacusa.com Website: www.hydacusa.com

DADINTERNATIONAL



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

Input data Switching ranges [l/min]	5 % accura	cv	10 % accuracy				
	5 /0 accura		Size 1	Size 2	Size 3		
	0.2 4.0	890	0.0050.06	0.02 0.2	10 30		
	0.6 5.0	5 110	0.04 0.13	0.20.6	15 45		
	0.5 8.0	10150	0.1 0.6	0.4 1.8	20 60		
	1 14	35220	0.2 1.2	0.83.2	30 90		
	114	35220	0.2 1.2	27	60 150		
	240	35250	0.4 2.0	313	00150		
	455		1.0 5.0	420			
	170		1.0 0.0	830			
Operating pressure	170			030			
Brass version	200 bar		300 bar	300 bar	250 bar		
Stainless steel version	200 bar 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 dimens	ons	0.02 0.2	0.02 0.5	0.02 0.4		
Parts in contact with medium		0.10					
Brass version	Stainless ste	el 1 4571	NBR ¹⁾ · Brass	· nickel-nlated	· Brass·		
	Hard ferrite	Stainless steel 1.4571; NBR ¹ ; Brass; nickel-plated; Brass; Hard ferrite					
Stainless steel version	Stainless ste	el 1.4571;	FPM ¹⁾ ; Hard f	ferrite			
Output data							
Switching outputs 2)	1 or 2 reed of						
-	Change-ove						
Accuracy	≤ ± 5 % or ≤						
Repeatability	2 % FS max	-		1			
Switching capacity			1	·r			
Change-over contact ³⁾ Male connection	ma - 25		max. - 200 V	max. - 250 V	max. - 250 V		
EN175301-803 (DIN 43650)	- 1.5		- 1 A	- 1.5 A	- 1.5 A		
	- 50		- 20 VA	- 50 VA	- 50 VA		
Male connection M12x1	ma	х.	max.	max.	max.		
	- 25		- 125 V	- 125 V	- 250 V		
	- 1.5		- 1 A	- 1.5 A	- 1.5 A		
N/O contact	50 ma		- 20 VA	- 50 VA	- 50 VA		
Male connection	- 25		max. - 200 V	max. - 230 V	max. - 250 V		
EN175301-803 (DIN 43650)	- 3		- 1 A	- 3 A	- 3 A		
· · · · · ·	- 100	VA	- 20 VA	- 60 VA	- 100 VA		
Male connection M12x1	ma		max.	max.	max.		
	- 25		- 125 V	- 125 V	- 250 V		
	- 3 - 100		- 1 A - 20 VA	- 3 A - 60 VA	- 3 A - 100 VA		
Environmental Conditions			20 111	00 1/1	100 1/1		
Operating temperature range	-20 + 70 °	0					
Fluid temperature range		-					
Male connection							
EN175301-803 (DIN 43650)			l -20 +160 °	C)			
Male connection M12x1	-20 +85 °C			_			
(Directive 20						
Protection class to IEC 60529	Directive 20 IP 65	04/108/E	U				
Other data							
	Proop (picks	l ploted) cr	ataiplass ats	1 1 1 571			
Housing material Electrical connection			stainless stee				
	Male connection EN175301-803 (DIN 43650)						

Male connection M12x1

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

Model code:
HFS 25XX – <u>XX</u> – <u>XXX–XXXX</u> – X – X – X – <u>000</u>
Measuring principle
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
(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 I/min ⁵
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
$6 = \le \pm 5.0 \% FS$
7 = ≤ ± 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)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
Т	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:

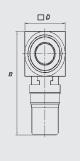
- The medium must not contain solid particles! We recommend using contamination strainers.
- External magnetic fields can affect the switching contact. Ensure sufficient distance from magnetic fields (e.g. from electric motors)!

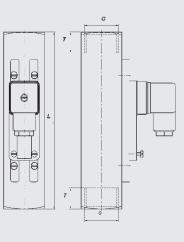
Dimensions without indicator:

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

Water 5 % Accuracy

0.2 4.0								
0.6 5.0]			1/4"	8			
0.5 8.0	27	30	86	3/8" 1/2"	10 15	14	130	850
1 14								
1 28								
2 40	27	30	86	1/2"	15	14	148	900
4 55	21	30	00	3/4"	20	16	174	300
1 70				0.14%		10	150	1.100
890	34 40	40 40	96 96	3/4" 1"	20 25	18 19	152 156	1400 1100
5 110			00		20		100	
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-

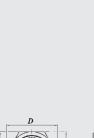
40
4

Water 10 % Accuracy - Size 2 -

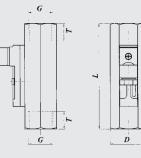
0.02 0.2								
0.2 0.6								
0.4 1.8								
0.8 3.2	27	31	67	1/2 "	15	15	90	250
2.0 7.0	21	31	07	1/2	15	15	90	350
3.0 13.0								
4.0 20.0								
8.0 30.0								

Water 10 % Accuracy - Size 3 -

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

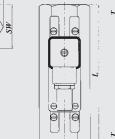


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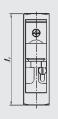


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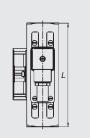
US 18.384.1/10.17

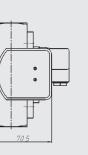
Dimensions with indicator:

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

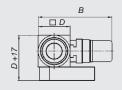
Water 5 % Accuracy

		-						
0.2 4.0								
0.6 5.0				1/4"	8			
0.5 8.0	27	30	86	3/8" 1/2"	10 15	14	130	940
1 14								
1 28								
2 40	27	30	86	1/2"	15	14	148	990
4 55	21	30	80	3/4"	20	16	174	990
1 70								
890	34 40	40 40	96 96	3/4" 1"	20 25	18 19	152 156	1490 1190
5 110			00		20		100	1100
10 150	50	50	101	1 1/4"	32	21	200	2840
35 220	50	50	106	1 1/4"	32	21	200	3090
35 250	60	50	107	1 1/2"	40	24	200	3890









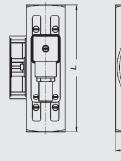
Water 10 % Accuracy - Size 2-

	toourc	.0, 0		•				
0.02 0.2								
0.2 0.6								
0.4 1.8								
0.8 3.2	30	30	70	1/2 "	15	15	90	570
2.0 7.0	30	30	10	1/2	15	15	90	570
3.0 13.0								
4.0 20.0								
8.030.0								

Water 10 % Accuracy - Size 3 -

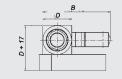
		-						
10 30								
15 45	41	47	93	3/4 " 1" ^{*)}	20 25	21	152	1430
20 60	41	47	93	1" ^{*)}	25	17	130	1250
30 90								
60 150	41	47	93	1"	25	17	130	1250

*) Standard

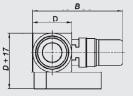


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Note:

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 90 Southland Dr. Bethlehem, PA 18017 Telephone +1 (610) 266-0100 E-mail: electronics@hydacusa.com Website: www.hydacusa.com

GYDAD INTERNATIONAL



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 ≤ ± 10 % FS
- Viscosity compensation from 30 .. 600 cSt
- Any mounting position
- High level of functional reliability
- High pressure resistance
- Threaded connection

Electronic Flow Transmitter HFT 2100 for Oils / Viscous Fluids

Technical data:

Input data Measuring ranges [I/min]	Size 1	Size 2				
measuring ranges [i/min]	0.5 1.6	0.5 1.5				
	0.8 3.0	1 4				
	2.0 7.0	28				
	2.0 7.0					
		3 10				
		5 15				
		8 24				
		1030				
		15 45				
		20 60				
		30 90				
		35 110				
Operating pressure	000	0507				
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	3				
Parts in contact with medium						
Brass version	Staini. st. 1.457	1; FPM ¹⁾ ; Brass, rass; Hard ferrite				
Stainless steel version		1; FPM ¹⁾ ; Hard ferrite				
Output data						
Output signal	4 20 mA, 3 cc	nductor				
Output signal	0 10 V, 3 cond					
Accuracy ²⁾	≤ ± 10 % FS					
Repeatability	1 % FS max.					
Environmental conditions	i /o i o indx.					
Operating temperature range	-20 +70 °C					
Fluid temperature range	-20 +70°C					
Viscosity range	30 600 cSt					
(f mark	Directive 2004 /	/ 108 / FC				
Protection class to IEC 60529	IP 67	100720				
Other data	11 07					
Supply voltage	18 30 V					
Power consumption	< 1 W					
Electrical connection	Male connection	n M12v1				
Housing material						
Measuring body	Brass (nickel-nl	ated) or st. steel 1.4571				
Transmitter	Brass (nickel-pl					

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

²⁾ 3 % possible with calibration to a certain viscosity

JS 18.395.1/10.17

Model code:
HFT 21X6-X-XXXX-XXXX -7-X-0-000 Measuring principle 2 = Variable area float Measuring medium 1 = Oils / viscous fluids
Mechanical connection $^{2) 3)}$ 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 I/min ³ 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 $$
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	+UB	+UB
2	reserved	reserved
3	GND	GND
4	4 20 mA	0 10 V

Notes on installation:

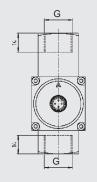
- The medium must not contain solid particles! We recommend using contamination strainers.
- External magnetic fields can affect the switching contact. Ensure sufficient distance from magnetic fields (e.g. from electric motors)!

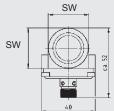
Dimensions:

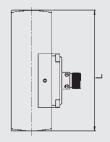
Size 1

Type [l/min]		Instal dimer [mm]	Weight (approx.) [g]		
	DN	SW	G	L	
0.5 1.6	8 10 15	24 24 30	1/4" 3/8" 1/2" ^{*)}	98 119 90	610 660 560
0.8 3.0	15	30	1/2"	90	560
2.0 7.0	15	30	1/2	90	500

*) Standard







Size 2								
Type [l/min]								
	DN	DN SW G L T						
0.5 1.5	8 15	34 34	1/4" 1/2"	152 152	10 14	1510 1435		
14	20 25	34 40	3/4" 1" ^{*)}	152 130	15 17	1350 1170		
28								
3 10	15 20	34 34 40	1/2" 3/4" 1" ^{*)}	152 152 130	14 15 17	1435 1350 1170		
5 15	20							
8 24								
10 30			0.14%	450		1050		
15 45	20 25	34 40	3/4" 1" ^{*)}	152 130	15	1350 1170		
20 60								
30 90	25	10	1"	130	47	1170		
35 110	23	40	1	130	17	1170		

*) 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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HYDAC ELECTRONICS

90 Southland Dr. Bethlehem, PA 18017 Telephone +1 (610) 266-0100 E-mail: electronics@hydacusa.com Website: www.hydacusa.com

HYDAC | 16

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DADINTERNATIONAL



Description:

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

The test medium deflects a springloaded 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

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

Technical data:

Input data								
Measuring ranges [l/min]	Size 1	Size 2	Size 3	Siz	ze 4			
	0.0050.06	0.02 0.2	10 30	0.2 4.0	890			
	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	114	35 220			
	0.4 2.0	27	60 150	1 28	35 250			
	0.5 3.0	313		240				
	1.0 5.0	420		4 55				
		830		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 dimension	ons		<u>^</u>				
Parts in contact with medium Brass version Stainless steel version	n Stainl. steel 1.4571; NBR ¹⁾ ; Brass (nickel-pl.); Brass; Hard ferrite Stainless steel 1.4571; FPM ¹⁾ ; Hard ferrite							
Output data								
Output signal	4 20 mA, 3 0 10 V, 3-co							
Accuracy	≤±3%FS							
Repeatability	1 % FS							
Environmental conditions								
Operating temperature range	-20 +70 °C							
Fluid temperature range	-20 +70 °C							
(E mark	Directive 200	04 / 108 / EC						
Protection class to IEC 60529	IP 67							
Other data								
Supply voltage	18 30 V D0	0						
Power consumption	< 1 W							
Housing material Measuring body Transmitter	Brass (nickel-plated) or stainless steel 1.4571 Brass (nickel-plated)							
Electrical connection	Male connec	tion M12x1						

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

Model code:
HFT $25X6 - X - XXXX - XXXX - 5 - X - 0 - 00$
Measuring principle Image: A constraint of the second se
Test medium 5 = Water / water-based
Mechanical connection $^{2)}$ 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 \square B = 0 10 V, 3 conductor C = 4 20 mA, 3 conductor
Measuring ranges in I/min Size 1
.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
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
Size 3
0010-0030; 0015-0045; 0020-0060; 0030-0090; 0060-0150
Size 4 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
Accuracy 5 = ≤ ± 3.0 % FS
Housing material B = Brass (nickel-plated) S = Stainless steel
Mechanical indicator 0 = Without indicator
Modification number 000 = Standard
 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.

US 18.601.0/10.17

Pin connections:

M12x1



Pin	HFT 25X6-C	HFT 25X6-B
1	+UB	+U _B
2	reserved	reserved
3	GND	GND
4	420 mA	010 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]	Instal [mm]	Installation dimensions [mm]							
	SW	D	В	G	DN	Т	L		
Size 1	Size 1								
0.0050.06									
0.040.13									
0.10.6									
0.21.2	17	18	39	1/4"	8	10	65	210	
0.42.0									
0.53.0									
1.05.0									
Size 2									
0.02 0.2									
0.2 0.6									
0.4 1.8									
0.8 3.2	30	30	62	1/2 "	15	14	90	560	
2.0 7.0	30	30	02	1/2	15	14	90	500	
3.0 13.0									
4.0 20.0									
8.030.0									

Size 3

0.20 0								
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

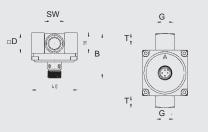
Size 4

0.2 4.0	-			1/4"	8 10 15	14	131	900
0.6 5.0								
0.5 8.0	27	40	52	3/8" 1/2"				
1 14								
1 28								
2 40	27	40	52	1/2" 3/4"	15 20	14 16	146 174	950
4 55	32							
1 70	34 40	40 40	62 62	3/4"				
8 90				1"	20 25	18	152 156	1420 1120
5 110			02		20		100	1120
10 150	50	50	72	1 1/4"	32	21	200	2770
35 220	50	50	72	1 1/4"	32	21	200	3020
35 250	60	50	72	1 1/2"	40	24	200	3820

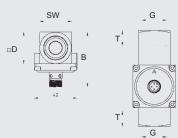
*) Standard

Note:

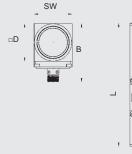
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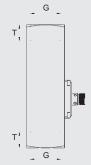








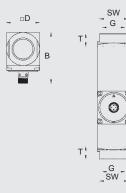




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