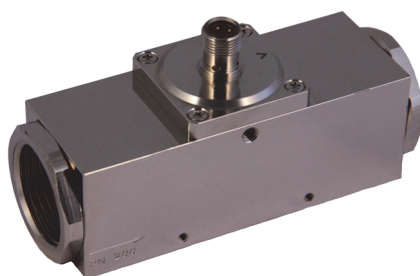


LABO-HD1K-S, LABO-HD1K-I/U/F/C, LABO-HD2K-S, LABO-HD2K-I, LABO-HR2E-S, LABO-HR2E-I, LABO-HR2VE-S, LABO-HR2VE-I

Датчики протока поршневого типа

GHM MESSTECHNIK



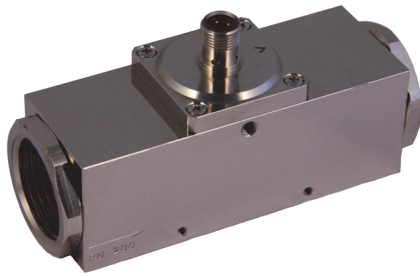
Технические характеристики

Архангельск (8182)63-90-72	Иваново (4932)77-34-06	Липецк (4742)52-20-81	Пенза (8412)22-31-16	Ставрополь (8652)20-65-13
Астана (7172)727-132	Ижевск (3412)26-03-58	Магнитогорск (3519)55-03-13	Пермь (342)205-81-47	Сургут (3462)77-98-35
Астрахань (8512)99-46-04	Иркутск (395)279-98-46	Москва (495)268-04-70	Ростов-на-Дону (863)308-18-15	Тверь (4822)63-31-35
Барнаул (3852)73-04-60	Казань (843)206-01-48	Мурманск (8152)59-64-93	Рязань (4912)46-61-64	Томск (3822)98-41-53
Белгород (4722)40-23-64	Калининград (4012)72-03-81	Набережные Челны (8552)20-53-41	Самара (846)206-03-16	Тула (4872)74-02-29
Брянск (4832)59-03-52	Калуга (4842)92-23-67	Нижний Новгород (831)429-08-12	Санкт-Петербург (812)309-46-40	Тюмень (3452)66-21-18
Владивосток (423)249-28-31	Кемерово (3842)65-04-62	Новокузнецк (3843)20-46-81	Саратов (845)249-38-78	Ульяновск (8422)24-23-59
Волгоград (844)278-03-48	Киров (8332)68-02-04	Новосибирск (383)227-86-73	Севастополь (8692)22-31-93	Уфа (347)229-48-12
Вологда (8172)26-41-59	Краснодар (861)203-40-90	Омск (3812)21-46-40	Симферополь (3652)67-13-56	Хабаровск (4212)92-98-04
Воронеж (473)204-51-73	Красноярск (391)204-63-61	Орел (4862)44-53-42	Смоленск (4812)29-41-54	Челябинск (351)202-03-61
Екатеринбург (343)384-55-89	Курск (4712)77-13-04	Оренбург (3532)37-68-04	Сочи (862)225-72-31	Череповец (8202)49-02-64

Киргизия (996)312-96-26-47 **Казахстан** (772)734-952-31 **Таджикистан** (992)427-82-92-69

<http://ghm.nt-rt.ru> || gmg@nt-rt.ru

Flow Transmitter/Switch LABO-HD1K-I / U / F / C



- 4..20 mA output linearised
- 0..10V output linearised
- Frequency output proportional, linear
- Programmable through teaching
- LED for status display
- All metal housing
- Fully potted IP 67
- All parameters programmable via USB interface ECI-1

Characteristics

Mechanical flow switch, for fluid media, with spring-supported piston and magnetic triggering of Hall sensors. Robust construction in brass or stainless steel.

The LABO electronics make various output signals available:

- Analog signal 0/4...20 mA (LABO-HD1K-...I)
- Analog signal 0/2..10 V (LABO-HD1K-...U)
- Frequency signal (LABO-HD1K-...F) or
- A value signal Pulse / x Litres (LABO-HD1K-...C)

A model with switching output is also available.

If desired, the range end value can be set to the currently existing flow using "teaching".

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LABO-HD1K-I/U/F/C

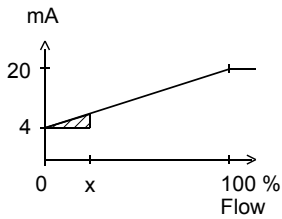
Technical data

Sensor	analog Hall sensors	
Nominal width	DN 8..25	
Process connection	female thread G 1/4..G 1 (further process connections available on request)	
Metering range	0.1..80 l/min	for details see see table "Ranges"
Pressure loss	0.4..1.6 bar at Q _{max.}	
Q_{max.}	to 100 l/min	
Tolerance	±3 % of full scale value	
Pressure resistance	PN 200 bar, optionally PN 500 bar	
Media temperature	-20..+85 °C optionally -20..+120 °C	
Ambient temperature	-20..+70 °C	
Media	water, oils (gases and aggressive media available on request)	
Wiring	see section "Wiring"	
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Outputs	LABO-....I: current output 4..20 mA (alternatively 0..20 mA) max. load 500 Ohm	
	LABO-....U: voltage output 0..10 V (alternatively 2..10 V) load min. 1 kOhm	
	LABO-....F: frequency output transistor output "push-pull" (resistant to short circuits, and reversal polarity protected) I _{out} = 100 mA max. selectable frequency, max. 2 kHz	
	LABO-....C: Transistor output "Push-Pull" I _{out} = 100 mA max. Pulse width 50 ms Pulse/Value is to be specified when ordering	
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)	
Ingress protection	IP 67	
Electrical connection	for round plug connector M12x1, 4-pole	
Materials medium-contact	<i>Brass construction:</i> CW614N nickelled, CW614N, 1.4310, hard ferrite, NBR	<i>Stainless steel construction:</i> 1.4571, 1.4404, 1.4310, hard ferrite PTFE-coated, FKM
Non-medium-contact materials	CW614N nickelled	
Weight	see table "Dimensions and weights"	
Conformity	CE	
Installation location	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the metering and switching range.	

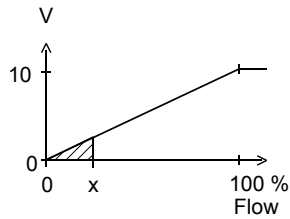
Signal output curves

Value x = Begin of the specified range
 = not specified range

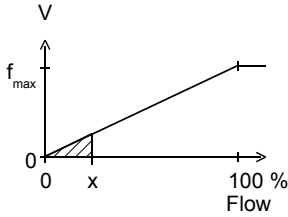
Current output



Voltage output



Frequency output



f_{max} selectable in the range of up to 2000 Hz

Other characters on request.

Ranges

Details in the table apply to horizontal inwards flow with increasing flow rate.

Standard type LABO-HD1K

Metering range l/min H ₂ O	Q _{max.} recommended	Pressure loss bar at Q _{max.} H ₂ O
0.1 - 1	6	0.4
0.5 - 5	10	0.5
1.0 - 10	20	0.6
2.0 - 20	30	0.4
3.0 - 30	40	
4.0 - 40	60	0.8
6.0 - 60	80	1.4
20.0 - 80	100	1.6

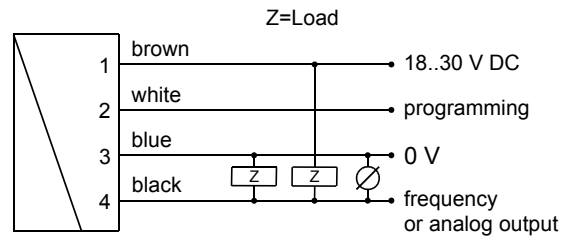
Special ranges are available.

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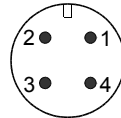
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LABO-HD1K-I/U/F/C

Wiring



Connection example: PNP NPN



Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

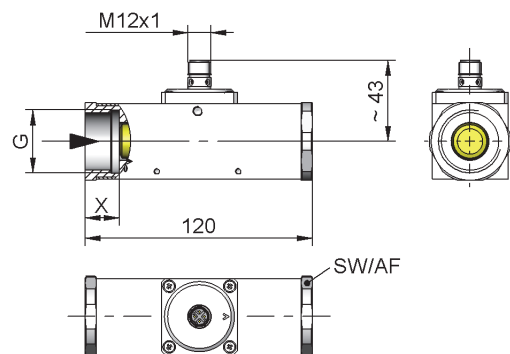
It is recommended to use shielded wiring.

The push-Pull output can as desired be switched as a PNP or an NPN output.

Dimensions and weights

Including LABO electronics

	G	Types	SW	X	Weight kg
Brass	G 1/4	...-008GM	40	15	1.5
	G 3/8	...-010GM			
	G 1/2	...-015GM		18	1.4
	G 3/4	...-020GM			
	G 1	...-025GM			
Stainless steel	G 1/4	...-008GK	41	15	1.5
	G 3/8	...-010GK			
	G 1/2	...-015GK		18	1.4
	G 3/4	...-020GK			
	G 1	...-025GK			



Handling and operation

Note

The metering range end value can be programmed by the user via "teaching". Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed. The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment. The teaching option is not available for LABO-HD1K-C.

- Include straight calming section of 5 x DN in inlet and outlet.
- Include a filter if the media are dirty (use magnetic filter for ferri- tic components)
- In case of unfavourable pressure conditions, for example at atmospheric pressure, may occur cavitation.

Programming

The teaching process can be carried out by the user as follows:

- The flow rate to be set is applied to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When teaching has been successfully completed, pin 2 should be connected to 0 V, so as to prevent unintended programming.

The devices have a yellow LED which flashes during the programming pulse. During operation, the LED serves as a display for operating voltage (for analog output) or of switching status (for frequency or pulse output).

To avoid the need to transit to an undesired operating status for the purpose of teaching, the device can be provided ex-works with a teach-offset. The teach-offset value is added to the currently measured value before saving. The offset value can be positive or negative.

Example: The end of the metering range should be set to 80 %. However, only 60 % can be achieved without problem. In this case, the device would be ordered with a "teach-offset" of +20%.. At a flow rate of 60 % in the process, teaching would then store a value of 80 %.

There are many more parameters which can be programmed by the ECI-1 device configurator if necessary.

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LABO-HD1K-I/U/F/C

Ordering code

The basic device is ordered e.g. HD1K-015GM005E with electronics e.g. LABO-HD1K-INS

HD1K 1. 2. 3. 4. 5.

 LABO-HD1K - 6. 7. 8. 9.

1. Nominal width	
008	DN 8 - G 1/4
010	DN 10 - G 3/8
015	DN 15 - G 1/2
020	DN 20 - G 3/4
025	DN 25 - G 1
2. Process connection	
G	female thread
3. Connection material	
M	brass
K	stainless steel
4. HD1K - Metering range H₂O for horizontal inwards flow	
001	0.1 - 1 l/min
005	0.5 - 5 l/min
010	1.0 - 10 l/min
020	2.0 - 20 l/min
030	3.0 - 30 l/min
040	4.0 - 40 l/min
060	6.0 - 60 l/min
080	20.0 - 80 l/min
5. Connection for	
E	electronics
6. Analog output	
I	current output 4..20 mA
U	voltage output 0..10 V
F	frequency output
C	pulse output
7. Programming	
N	cannot be programmed (no teaching)
P	<input type="radio"/> full scale value can be programmed
8. Electrical connection	
S	for round plug connector M12x1, 4-pole
9. Optional	
D	<input type="radio"/> medium temperature up to 120 °C (with spacers)

Required ordering information

For LABO-HD1K-F:

Output frequency at full scale Hz

Maximum value: 2000 Hz

For LABO-HD1K-C:

The volume must be specified for the pulse output version (with numerical value and unit) which will correspond to one pulse.

Volume per pulse (numerical value)

Volume per pulse (unit)

LABO options

Special range for analog output:

<= Metering range

(Standard=Metering range)

l/min

Special range for frequency output:

<= Metering range

(Standard=Metering range)

l/min

Power-On delay period (0..99 s)

(time after applying power during which the outputs are not activated or set to defined values)

s

Teach-offset

(in percent of the metering range)

Standard = 0 %

%

HD1K options

- Special ranges

Further options available on request.

Accessories

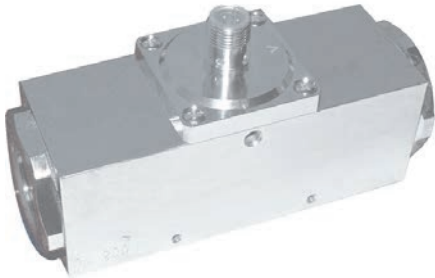
- Cable/round plug connector (KB...)
see additional information "Accessories"
- Converter OMNI-TA
- Device configurator ECI-1

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LABO-HD1K-I/U/F/C

Flow Transmitter/Switch LABO-HD1K-S



- Switching output push-pull (small hysteresis possible)
- Programmable through teaching
- LED for status display
- All metal housing
- Fully potted IP 67
- All parameters programmable via USB interface ECI-1

Characteristics

Mechanical flow switch, for fluid media, with spring-supported piston and magnetic triggering of Hall sensors. Robust construction in brass or stainless steel.

The LABO electronics fitted to the device make available an electronic switching output (Push-Pull) with adjustable characteristics (minimum/maximum) and hysteresis, which responds when an adjustable limit is fallen short of or exceeded.

If desired, the switching value can be set to the currently existing flow using "teaching". Models with analog or pulse output are also available (see separate data sheets).

In contrast to electromechanical switches (Reed contacts or microswitches), electronic switches are insensitive to impact and wear.

There is no galvanic separation from the supply circuit.

Technical data

Sensor	analog Hall sensors	
Nominal width	DN 8..25	
Process connection	female thread G 1/4..G 1	
Metering range	0.1..80 l/min	for details see see table "Ranges"
Pressure loss	0.4..1.6 bar at Q _{max.}	
Q_{max.}	to 100 l/min	
Tolerance	±3 % of full scale value	
Pressure resistance	PN 200 bar, optionally PN 500 bar	
Media temperature	-20..+85 °C optionally -20..+120 °C	
Ambient temperature	-20..+70 °C	
Media	water, oils (gases and aggressive media available on request)	
Wiring	see section "Wiring"	
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Outputs	transistor output "push-pull" (resistant to short circuits, and reversal polarity protected) I _{out} = 100 mA max.	
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)	
Ingress protection	IP 67	
Electrical connection	for round plug connector M12x1, 4-pole	
Materials medium-contact	<i>Brass construction:</i> CW614N nickelled, CW614N, 1.4310, hard ferrite, NBR	<i>Stainless steel construction:</i> 1.4571, 1.4404, 1.4310, hard ferrite PTFE-coated, FKM
Non-medium-contact materials	CW614N nickelled	
Weight	see table "Dimensions and weights"	
Conformity	CE	
Installation location	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the metering and switching range.	

Product Information

Sensors and Instrumentation

Ranges

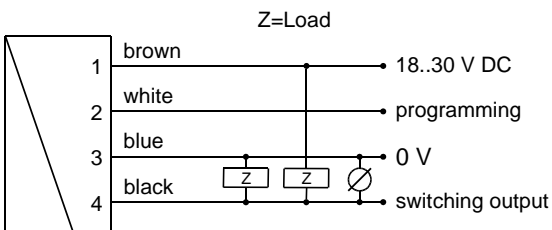
Details in the table apply to horizontal inwards flow with increasing flow rate.

Standard type LABO-HD1K

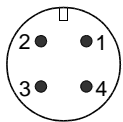
Metering range l/min H ₂ O	Q _{max.} recommended	Pressure loss bar at Q _{max.} H ₂ O
0.1 - 1	6	0.4
0.5 - 5	10	0.5
1.0 - 10	20	0.6
2.0 - 20	30	0.4
3.0 - 30	40	
4.0 - 40	60	
6.0 - 60	80	0.8
20.0 - 80	100	1.4
		1.6

Special ranges are available.

Wiring



Connection example: PNP NPN



Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

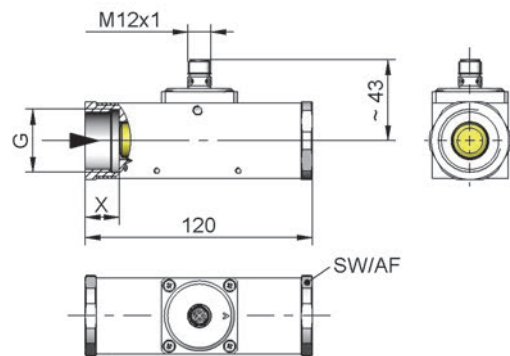
It is recommended to use shielded wiring.

The push-Pull output can as desired be switched as a PNP or an NPN output.

Dimensions and weights

Including LABO electronics

	G	Types	SW	X	Weight kg
Brass	G 1/4	...-008GM	40	15	1.5
	G 3/8	...-010GM			
	G 1/2	...-015GM		18	1.4
	G 3/4	...-020GM			
	G 1	...-025GM			
Stainless steel	G 1/4	...-008GK	41	15	1.5
	G 3/8	...-010GK			
	G 1/2	...-015GK		18	1.4
	G 3/4	...-020GK			
	G 1	...-025GK			



Handling and operation

Note

The switching value can be programmed by the user via "teaching". If desired, programmability can be blocked by the manufacturer.

The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

- Include straight calming section of 5 x DN in inlet and outlet.
- Include a filter if the media are dirty (use magnetic filter for ferritic components)
- In case of unfavourable pressure conditions, for example at atmospheric pressure, may occur cavitation.

Product Information

Sensors and Instrumentation

Operation and programming

The switching value is set as follows:

- Apply the flow rate to be set to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

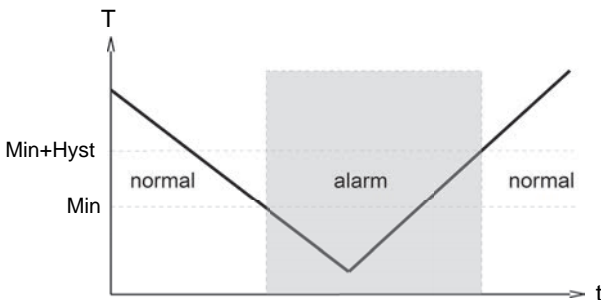
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

To avoid the need to transit to an undesired operating status for the purpose of teaching, the device can be provided ex-works with a teach-offset. The teach-offset value is added to the currently measured value before saving.

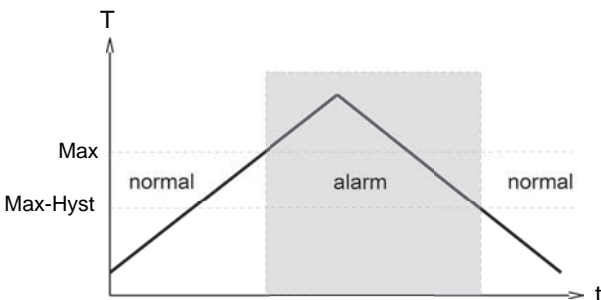
Example: The end of the metering range should be set to 80 %. However, only 60 % can be achieved without problem. In this case, the device would be ordered with a "teach-offset" of +20 %.. At a flow rate of 60 % in the process, teaching would then store a value of 80 %.

The LABO-HD1K-S limit switch can be used to monitor minimal or maximal.

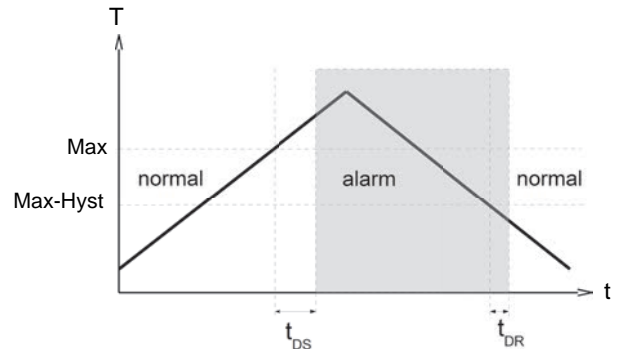
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.

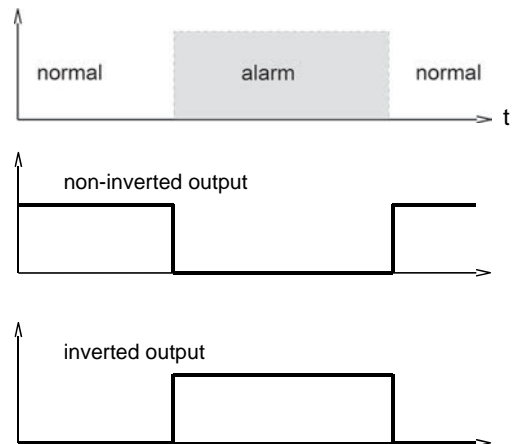


A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.

In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On-Delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Product Information

Sensors and Instrumentation

Ordering code

The basic device is ordered e.g. HD1K-015GM005E with electronics e.g. LABO-HD1K-SPLOS

HD1K - 1. 2. **G** 3. 4.

LABO-HD1K - 5. 6. 7. 8. 9. **S** 10.

1. Nominal width	
008	DN 8 - G $\frac{1}{4}$
010	DN 10 - G $\frac{3}{8}$
015	DN 15 - G $\frac{1}{2}$
020	DN 20 - G $\frac{3}{4}$
025	DN 25 - G 1
2. Process connection	
G	female thread
3. Connection material	
M	brass
K	stainless steel
4. HD1K - Metering range H₂O for horizontal inwards flow	
001	0.1 - 1 l/min
005	0.5 - 5 l/min
010	1.0 - 10 l/min
020	2.0 - 20 l/min
030	3.0 - 30 l/min
040	4.0 - 40 l/min
060	6.0 - 60 l/min
080	20.0 - 80 l/min
5. Switching output (Limit switch)	
S	Push-Pull (compatible with PNP and NPN)
6. Programming	
P	programmable (teaching possible)
N	<input type="radio"/> cannot be programmed (no teaching)
7. Switching function	
L	minimum-switch
H	maximum-switch
8. Switching output level	
O	standard
I	<input type="radio"/> inverted
9. Electrical connection	
S	for round plug connector M12x1, 4-pole
10. Optional	
D	<input type="radio"/> media temperature up to 120 °C (with spacers)

Options for LABO:

Switching delay period (0.0..99.9 s) . s
(from Normal to Alarm)

Switch-back delay period (0.0..99.9 s) . s
(from Alarm to Normal)

Power-On delay period (0..99 s) s
(After connecting the supply, time during which the switching output is not activated)

Switching output fixed at l/min

Switching hysteresis %
Standard = 2 % of the metering range

Teach-offset %
(in percent of the metering range)
Standard = 0 %

If the fields are not completed, the standard setting is selected automatically.

Options HD1K

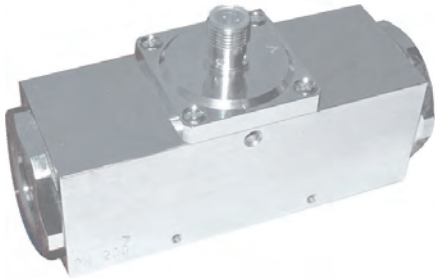
- Special ranges

Further options available on request.

Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- Converter OMNI-TA
- Device configurator ECI-1

Flow Transmitter/Switch LABO-HD2K-I / U / F / C



- 4..20 mA output linearised
- 0..10V output linearised
- Frequency output proportional, linear
- Programmable through teaching
- LED for status display
- All metal housing
- Fully potted IP 67
- All parameters programmable via USB interface ECI-1

Characteristics

Mechanical flow switch, for oil, with spring-supported piston and magnetic triggering of Hall sensors. Robust construction in brass or stainless steel.

The LABO electronics make various output signals available:

- Analog signal 0/4...20 mA (LABO-HD2K-...I)
- Analog signal 0/2..10 V (LABO-HD2K-...U)
- Frequency signal (LABO-HD2K-...F) or
- A value signal Pulse / x Litres (LABO-HD2K-...C)

A model with switching output is also available.

If desired, the range end value can be set to the currently existing flow using "teaching".


Technical data

Sensor	analog Hall sensors	
Nominal width	DN 8..25	
Process connection	female thread G 1/4..G 1	
Metering range	0.5..60 l/min	for details see see table "Ranges"
Pressure loss	1.1..3.5 bar at Q_{max}	
Q_{max}	To 80 l/min	
Tolerance	±3 % of full scale value	
Pressure resistance	PN 200 bar, optionally PN 500 bar	
Media temperature	-20..+85 °C optionally -20..+120 °C	
Ambient temperature	-20..+70 °C	
Media	oils	
Wiring	see section "Wiring"	
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Outputs	<p>LABO-...I: current output 4..20 mA (alternatively 0..20 mA) max. load 500 Ohm</p> <p>LABO-...U: voltage output 0..10 V (alternatively 2..10 V) load min. 1 kOhm</p> <p>LABO-...F: frequency output transistor output "push-pull" (resistant to short circuits, and reversal polarity protected) $I_{out} = 100$ mA max. selectable frequency, max. 2 kHz</p> <p>LABO-...C: Transistor output "Push-Pull" $I_{out} = 100$ mA max. Pulse width 50 ms Pulse/Value is to be specified when ordering</p>	
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)	
Ingress protection	IP 67	
Electrical connection	for round plug connector M12x1, 4-pole	
Materials medium-contact	<i>Brass construction:</i> CW614N nickelled, CW614N, 1.4310, hard ferrite, NBR	<i>Stainless steel construction:</i> 1.4571, 1.4404, 1.4310, hard ferrite PTFE-coated, FKM
Non-medium-contact materials	CW614N nickelled	
Weight	see table "Dimensions and weights"	
Conformity	CE	
Installation location	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the metering and switching range.	

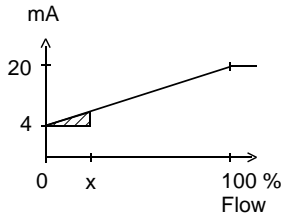
Product Information

Sensors and Instrumentation

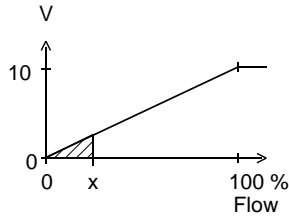
Signal output curves

Value x = Begin of the specified range
 = not specified range

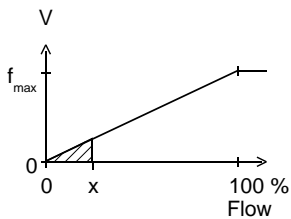
Current output



Voltage output



Frequency output



f_{max} selectable in the range of up to 2000 Hz

Other characters on request.

Ranges

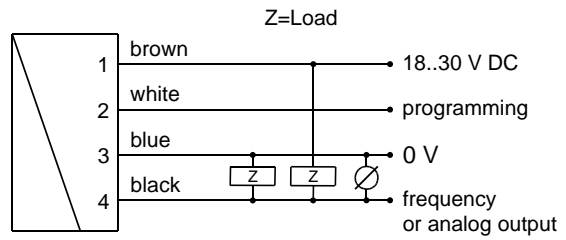
Details in the table apply to horizontal inwards flow with increasing flow rate.

Viscosity compensated type LABO-HD2K

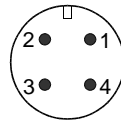
Metering range l/min oil 30..330 mm ² /s	Q _{max.} recommended	Pressure loss bar at Q _{max.} oil mm ² /s					Viscosity stability
		30	60	100	205	330	
0.5 - 8	12	1.1	1.4	1.6	2.8	3.5	±8 %, min.
1.5 - 15	22	2.2	2.3	2.4			±0.3 l/min
2.5 - 25	35	1.9	2.0	2.1	2.3	2.9	±0.5 l/min
6.0 - 40	60					2.6	±0.8 l/min
12.0 - 60	80	2.1	2.3	2.4	2.6	2.8	±2.7 l/min
							±3.0 l/min

Special ranges are available.

Wiring



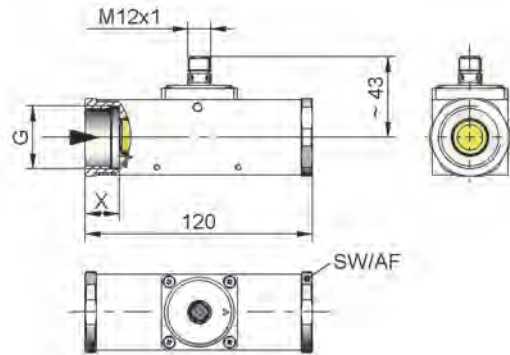
Connection example: PNP NPN



Dimensions and weights

Including LABO electronics

	G	Types	SW	X	Weight kg
Brass	G 1/4	...-008GM	40	15	1.5
	G 3/8	...-010GM			
	G 1/2	...-015GM		18	1.4
	G 3/4	...-020GM			
	G 1	...-025GM			
Stainless steel	G 1/4	...-008GK	41	15	1.5
	G 3/8	...-010GK			
	G 1/2	...-015GK		18	1.4
	G 3/4	...-020GK			
	G 1	...-025GK			



Product Information

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Handling and operation

Note

The metering range end value can be programmed by the user via "teaching". Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed. The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment. The teaching option is not available for LABO-HD2K-C.

- Include straight calming section of 5 x DN in inlet and outlet.
- Include a filter if the media are dirty (use magnetic filter for ferritic components)
- In case of unfavourable pressure conditions, for example at atmospheric pressure, may occur cavitation.

Programming

The teaching process can be carried out by the user as follows:

- The flow rate to be set is applied to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When teaching has been successfully completed, pin 2 should be connected to 0 V, so as to prevent unintended programming.

The devices have a yellow LED which flashes during the programming pulse. During operation, the LED serves as a display for operating voltage (for analog output) or of switching status (for frequency or pulse output).

To avoid the need to transit to an undesired operating status for the purpose of teaching, the device can be provided ex-works with a teach-offset. The teach-offset value is added to the currently measured value before saving. The offset value can be positive or negative.

Example: The end of the metering range should be set to 80 %. However, only 60 % can be achieved without problem. In this case, the device would be ordered with a "teach-offset" of +20 %.. At a flow rate of 60 % in the process, teaching would then store a value of 80 %.

There are many more parameters which can be programmed by the ECI-1 device configurator if necessary.

Ordering code

The basic device is ordered e.g. HD2K-015GM005E with electronics e.g. LABO-HD2K-INS

HD2K - 1. 2. 3. 4.

LABO-HD2K - 5. 6. 7. 8.

1. Nominal width	
008	DN 8 - G 1/4
010	DN 10 - G 3/8
015	DN 15 - G 1/2
020	DN 20 - G 3/4
025	DN 25 - G 1
2. Process connection	
G	female thread
3. Connection material	
M	brass
K	stainless steel
4. HD2K - metering range oil 30..330 mm²/s for horizontal inwards flow	
008	0.5 - 8 l/min
015	1.5 - 15 l/min
025	2.5 - 25 l/min
040	6.0 - 40 l/min
060	12.0 - 60 l/min
5. Analog output	
I	current output 4..20 mA
U	voltage output 0..10 V
F	frequency output
C	pulse output
6. Programming	
N	cannot be programmed (no teaching)
P	<input type="radio"/> full scale value can be programmed
7. Electrical connection	
S	for round plug connector M12x1, 4-pole
8. Optional	
D	<input type="radio"/> medium temperature up to 120 °C (with spacers)

Required ordering information

For LABO-HD2K-F:

Output frequency at full scale Hz

Maximum value: 2000 Hz

For LABO-HD2K-C:

The volume must be specified for the pulse output version (with numerical value and unit) which will correspond to one pulse.

Volume per pulse (numerical value)

Volume per pulse (unit)

LABO options

Special range for analog output: l/min

<= Metering range
(Standard=Metering range)

Special range for frequency output: l/min

<= Metering range
(Standard=Metering range)

Power-On delay period (0..99 s) s

(time after applying power during which the outputs are not activated or set to defined values)

Teach-offset %

(in percent of the metering range)
Standard = 0 %

HD2K options

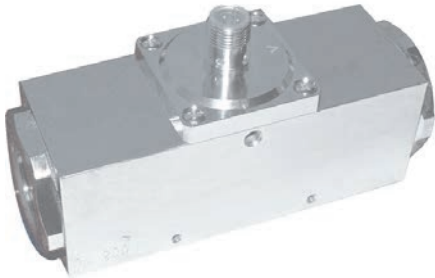
- Special values

Further options available on request.

Accessories

- Cable/round plug connector (KB...)
see additional information "Accessories"
- Converter OMNI-TA
- Device configurator ECI-1

Flow Transmitter/Switch LABO-HD2K-S



- viscosity stabilized
- Switching output push-pull (small hysteresis possible)
- Programmable through teaching
- LED for status display
- All metal housing
- Fully potted IP 67
- All parameters programmable via USB interface ECI-1

Characteristics

Mechanical flow switch, for oil, with spring-supported piston and magnetic triggering of Hall sensors. Robust construction in brass or stainless steel.

The LABO electronics fitted to the device make available an electronic switching output (Push-Pull) with adjustable characteristics (minimum/maximum) and hysteresis, which responds when an adjustable limit is fallen short of or exceeded.

If desired, the switching value can be set to the currently existing flow using "teaching". Models with analog or pulse output are also available (see separate data sheets).

In contrast to electromechanical switches (Reed contacts or microswitches), electronic switches are insensitive to impact and wear.

There is no galvanic separation from the supply circuit.

Technical data

Sensor	analog Hall sensors	
Nominal width	DN 8..25	
Process connection	female thread G 1/4..G 1	
Metering range	0.5..60 l/min	for details see see table "Ranges"
Pressure loss	1.1..3.5 bar at Q _{max.}	
Q_{max.}	to 80 l/min	
Tolerance	±3 % of full scale value	
Pressure resistance	PN 200 bar, optionally PN 500 bar	
Media temperature	-20..+85 °C optionally -20..+150 °C	
Ambient temperature	-20..+70 °C	
Media	oils	
Wiring	see section "Wiring"	
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Outputs	transistor output "push-pull" (resistant to short circuits, and reversal polarity protected) I _{out} = 100 mA max.	
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)	
Ingress protection	IP 67	
Electrical connection	for round plug connector M12x1, 4-pole	
Materials medium-contact	<i>Brass construction:</i> CW614N nickelled, CW614N, 1.4310, hard ferrite, NBR	<i>Stainless steel construction:</i> 1.4571, 1.4404, 1.4310, hard ferrite PTFE-coated, FKM
Non-medium-contact materials	CW614N nickelled	
Weight	see table "Dimensions and weights"	
Conformity	CE	
Installation location	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the metering and switching range.	

Product Information

Sensors and Instrumentation

Ranges

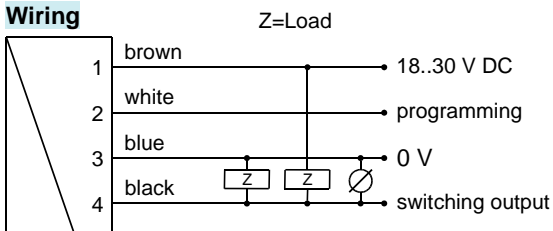
Details in the table apply to horizontal inwards flow with increasing flow rate.

Viscosity compensated type LABO-HD2K

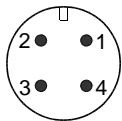
Metering range l/min oil 30..330 mm ² /s	Q _{max.} recommended	Pressure loss bar at Q _{max.} oil mm ² /s					Viscosity stability ±8 %, min.
		30	60	100	205	330	
0.5 - 8	12	1.1	1.4	1.6	2.8	3.5	±0.3 l/min
1.5 - 15	22	2.2	2.3	2.4			±0.5 l/min
2.5 - 25	35	1.9	2.0	2.1	2.3	2.9	±0.8 l/min
6.0 - 40	60					2.6	±2.7 l/min
12.0 - 60	80	2.1	2.3	2.4	2.6	2.8	±3.0 l/min

Special ranges are available.

Wiring



Connection example: PNP NPN



Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

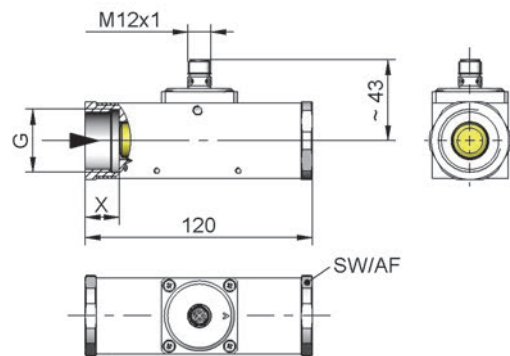
It is recommended to use shielded wiring.

The push-Pull output can as desired be switched as a PNP or an NPN output.

Dimensions and weights

Including LABO electronics

	G	Types	SW	X	Weight kg
Brass	G 1/4	...-008GM	40	15	1.5
	G 3/8	...-010GM			
	G 1/2	...-015GM		18	1.4
	G 3/4	...-020GM			
	G 1	...-025GM			
Stainless steel	G 1/4	...-008GK	41	15	1.5
	G 3/8	...-010GK			
	G 1/2	...-015GK		18	1.4
	G 3/4	...-020GK			
	G 1	...-025GK			



Handling and operation

Note

The switching value can be programmed by the user via "teaching". If desired, programmability can be blocked by the manufacturer.

The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

- Include straight calming section of 5 x DN in inlet and outlet.
- Include a filter if the media are dirty (use magnetic filter for ferritic components)
- In case of unfavourable pressure conditions, for example at atmospheric pressure, may occur cavitation.

Product Information

Sensors and Instrumentation

Operation and programming

The switching value is set as follows:

- Apply the flow rate to be set to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

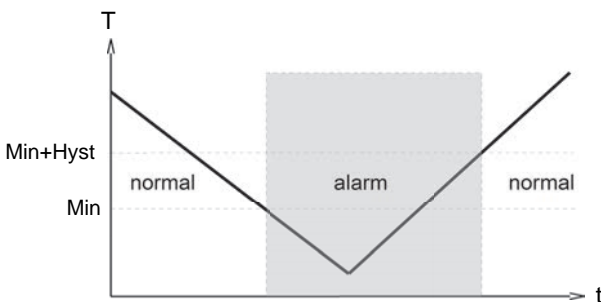
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

To avoid the need to transit to an undesired operating status for the purpose of teaching, the device can be provided ex-works with a teach-offset. The teach-offset value is added to the currently measured value before saving.

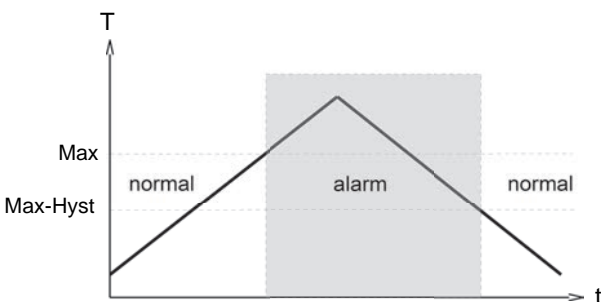
Example: The end of the metering range should be set to 80 %. However, only 60 % can be achieved without problem. In this case, the device would be ordered with a "teach-offset" of +20 %.. At a flow rate of 60 % in the process, teaching would then store a value of 80 %.

The LABO-HD2K-S limit switch can be used to monitor minimal or maximal.

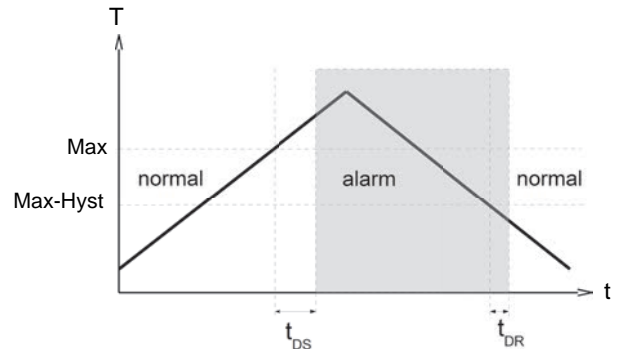
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.

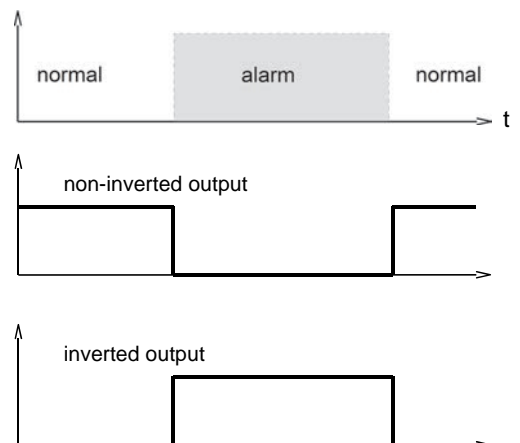


A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.

In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On-Delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Product Information

Sensors and Instrumentation

Ordering code

The basic device is ordered e.g. HD2K-015GM005E with electronics e.g. LABO-HD2K-SPLOS

HD2K - 1. 2. 3. 4.
 G

LABO-HD2K - 5. 6. 7. 8. 9. 10.
 S

1. Nominal width	
008	DN 8 - G $\frac{1}{4}$
010	DN 10 - G $\frac{3}{8}$
015	DN 15 - G $\frac{1}{2}$
020	DN 20 - G $\frac{3}{4}$
025	DN 25 - G 1
2. Process connection	
G	female thread
3. Connection material	
M	brass
K	stainless steel
4. HD2K - metering range oil 30..330 mm²/s for horizontal inwards flow	
008	0.5 - 8 l/min
015	1.5 - 15 l/min
025	2.5 - 25 l/min
040	6.0 - 40 l/min
060	12.0 - 60 l/min
5. Switching output (Limit switch)	
S	Push-Pull (compatible with PNP and NPN)
6. Programming	
P	programmable (teaching possible)
N	<input type="radio"/> cannot be programmed (no teaching)
7. Switching function	
L	minimum-switch
H	maximum-switch
8. Switching output level	
O	standard
I	<input type="radio"/> inverted
9. Electrical connection	
S	for round plug connector M12x1, 4-pole
10. Optional	
D	<input type="radio"/> medium temperature up to 120 °C (with spacers)

Options for LABO:

Switching delay period (0.0..99.9 s) . s
 (from Normal to Alarm)

Switch-back delay period (0.0..99.9 s) . s
 (from Alarm to Normal)

Power-On delay period (0..99 s) s
 (After connecting the supply, time during which the switching output is not activated)

Switching output fixed at l/min

Switching hysteresis %
 Standard = 2 % of the metering range

Teach-offset %
 (in percent of the metering range)
 Standard = 0 %

If the fields are not completed, the standard setting is selected automatically.

Options HD2K

- Special ranges

Further options available on request.

Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- Converter OMNI-TA
- Device configurator ECI-1

Flow transmitter LABO-HR2E-I / U / F / C



- Optimised for use with water
- 4..20 mA output linearised
- 0..10V output linearised
- Frequency output proportional, linear
- Programmable through teaching
- LED for status display
- All metal housing
- Fully potted IP 67
- All parameters programmable via USB interface ECI-1

Characteristics

Mechanical flow switch, for fluid media, with spring-supported piston and magnetic triggering of Hall sensors. Robust construction in brass or stainless steel.

The LABO electronics make various output signals available:

- Analog signal 0/4...20 mA (LABO-HR2E-...I)
- Analog signal 0/2..10 V (LABO-HR2E-...U)
- Frequency signal (LABO-HR2E-...F) or
- A value signal Pulse / x Litres (LABO-HR2E-...C)

A model with switching output is also available.

If desired, the range end value can be set to the currently existing flow using "teaching".

Technical data


Sensor	analog Hall sensors	
Nominal width	DN 32 / 40 / 50	
Process connection	female thread G 1 1/4..G 2 (further process connections available on request)	
Metering range	5..300 l/min	For details see table "Ranges"
Pressure loss	~ 1 bar at Q _{max}	
Q_{max}	up to 300 l/min	
Measurement accuracy	±8 % of full scale value	
Pressure resistance	PS 200 bar	
Medium temperature	-20..+85 °C, optionally -20..+120 °C	
Ambient temperature	-20..+70 °C	
Media	water	
Wiring	see section "Wiring"	
Materials medium-contact	<i>Brass construction:</i> CW614N nickelled, CW614N, 1.4305, 1.4310, hard ferrite	<i>Stainless steel construction:</i> 1.4571, 1.4310, hard ferrite
Non-medium-contact materials	CW614N nickelled	
Power supply	18..30 V DC	
Power consumption	< 1 W	
Outputs	<p>LABO-...I: Current output 4..20 mA (alternatively 0..20 mA) Max. load 500 Ohm</p> <p>LABO-...U: Voltage output 0..10 V (alternatively 2..10 V) Load min. 1 kOhm</p> <p>LABO-...F: Frequency output Transistor output "Push-Pull" (resistant to short circuits, and reversed polarity protected) I_{out} = 100 mA max. Selectable frequency, max. 2 kHz</p> <p>LABO-...C: Transistor output "Push-Pull" I_{out} = 100 mA max. Pulse width 50 ms Pulse/Value is to be specified when ordering</p>	
Electrical connection	for round plug connector M12x1, 4-pole	
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)	
Ingress protection	IP 67	
Weight	see table "Dimensions and weights"	
Conformity	CE	
Installation location	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the metering and switching range.	

Product Information

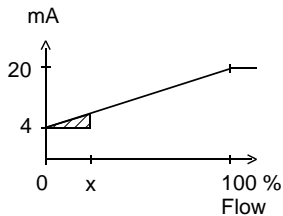
Sensors and Instrumentation

Signal output curves

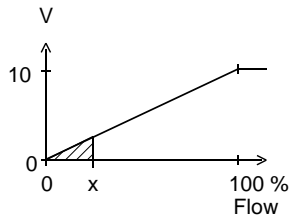
Value x = Begin of the specified range

 = not specified range

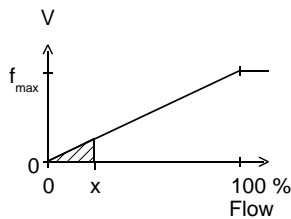
Current output



Voltage output



Frequency output



f_{max} selectable in the range of up to 2000 Hz

Other characters on request.

Ranges

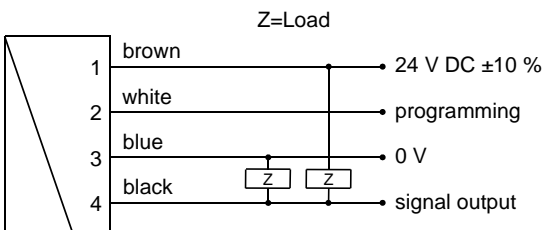
Details in the table correspond to metering ranges with horizontal inwards flow and increasing flow rate.

Standard type LABO-HR2E

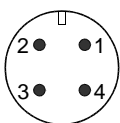
Metering range l/min H ₂ O	Q _{max.} recommended
5 - 60	300 l/min
10 - 100	300 l/min
15 - 200	300 l/min
25 - 300	300 l/min

Special ranges are available.

Wiring



Connection example: PNP NPN



Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring.

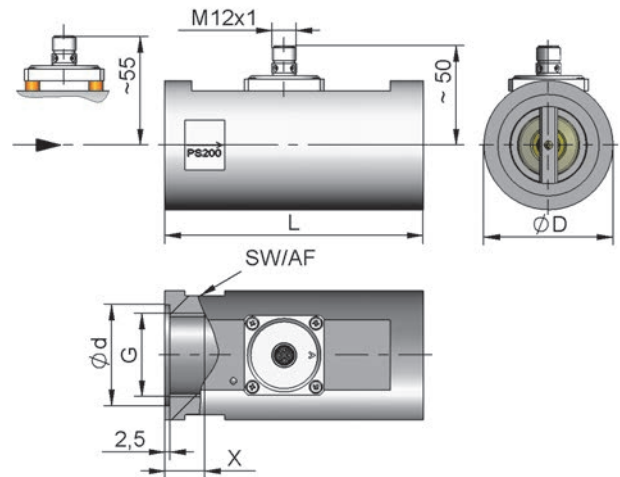
The Push-Pull output can as desired be switched as a PNP or an NPN output.

Dimensions and weights

..including LABO electronics

DN	G	Types	L	ØD	SW	Ød	X	Weight kg
32	G 1/4	HR2E -032GM	130	65	60	51	23	2.6
40	G 1/2	HR2E -040GM	170	65	60	56	24	3.2
50	G 2	HR2E -050GM	185	80	75	70	26	5.3

High temperature



Handling and operation

Note

The metering range end value can be programmed by the user via "teaching". Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed. The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

The teaching option is not available for LABO-HR2E-C.

- Include straight calming section of 5 x DN in inlet and outlet.
- Include a filter if the media are dirty (use magnetic filter for ferritic components)

Operation and programming

The teaching process can be carried out by the user as follows:

- The flow rate to be set is applied to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When teaching has been successfully completed, pin 2 should be connected to 0 V, so as to prevent unintended programming.

The devices have a yellow LED which flashes during the

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programming pulse. During operation, the LED serves as a display for operating voltage (for analog output) or of switching status (for frequency or pulse output).

To avoid the need to transit to an undesired operating status for the purpose of teaching, the device can be provided ex-works with a teach-offset. The teach-offset point is added to the currently measured value before saving. The offset point can be positive or negative.

Example: The end of the metering range should be set to 80 %. However, only 60 % can be achieved without problem. In this case, the device would be ordered with a "teach-offset" of +20%.. At a flow rate of 60 % in the process, teaching would then store a value of 80 %.

There are many more parameters which can be programmed by the ECI-1 device configurator if necessary.

Ordering code

The basic device is ordered e.g. HR2E-032GM100 with electronics e.g. LABO-HR2E-CPSD

HR2E - 1. 2. 3. 4. **G**

LABO - HR2E - 5. 6. 7. **S** 8. **D**

○=Option

1. Nominal width	
032	DN 32 - G 1 ¹ / ₄
040	DN 40 - G 1 ¹ / ₂
050	DN 50 - G 2
2. Process connection	
G	female thread
3. Connection material	
M	brass
K	stainless steel
4. HR2E - Metering range H₂O for horizontal inwards flow	
060	5 - 60 l/min
100	10 - 100 l/min
200	15 - 200 l/min
300	25 - 300 l/min

5. Signal output	
I	current output 4..20 mA
U	voltage output 0..10 V
F	frequency output
C	pulse output
6. Programming	
N	cannot be programmed (no teaching)
P	<input type="radio"/> full scale value can be programmed (teaching possible)
7. Electrical connection	
S	for round plug connector M12x1, 4-pole
8. Optional	
D	<input type="radio"/> medium temperature up to 120 °C (with spacers)

Required ordering information

For LABO-HR2E-...F:

Output frequency at full scale Hz

Maximum value: 2000 Hz

For LABO-HR2E-...C:

The volume must be specified for the pulse output version (with numerical value and unit) which will correspond to one pulse.

Volume per pulse (numerical value)

Volume per pulse (unit)

LABO options

Special range for analog output: l/min

<= Metering range
(Standard=Metering range)

Special range for frequency output: l/min

<= Metering range
(Standard=Metering range)

Power-On delay period (0..99 s) s

(time after applying power during which the outputs are not activated or set to defined values)

Teach-offset %

(in percent of the metering range)

Standard = 0 %

HR2E options

- Special values

Further options available on request.

Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- Converter OMNI-TA
- Device configurator ECI-1

Flow switch LABO-HR2E-S



- Optimized for use with water
- Versatile, configurable switching output in Push-Pull model (small hysteresis possible)
- Programmable through teaching
- LED for status display
- All metal housing
- Fully potted IP 67
- All parameters programmable via USB interface ECI-1

Characteristics

Mechanical flow switch, for fluid media, with spring-supported piston and magnetic triggering of Hall sensors. Robust construction in brass or stainless steel.

The LABO electronics fitted to the device make available an electronic switching output (Push-Pull) with adjustable characteristics (minimum/maximum) and hysteresis, which responds when an adjustable limit is fallen short of or exceeded.

If desired, the switching value can be set to the currently existing flow using "teaching". Models with analog or pulse output are also available (see separate data sheets).

In contrast to electromechanical switches (Reed contacts or microswitches), electronic switches are insensitive to impact and wear.

There is no galvanic separation from the supply circuit.

Technical data

Sensor	analog Hall sensors	
Nominal width	DN 32 / 40 / 50	
Process connection	female thread G 1 1/4..G 2 (further process connections available on request)	
Metering range	5..300 l/min	for details see table "Ranges"
Pressure loss	~ 1 bar at Q _{max}	
Q_{max}	up to 300 l/min	
Measurement accuracy	±8 % of full scale value	
Pressure resistance	PS 200 bar	
Medium temperature	-20..+85 °C, optionally -20..+120 °C	
Ambient temperature	-20..+70 °C	
Media	water	
Wiring	see section "Wiring"	
Materials medium-contact	<i>Brass construction:</i> CW614N nickelled, CW614N, 1.4305, 1.4310, hard ferrite	<i>Stainless steel construction:</i> 1.4571, 1.4310, hard ferrite
Non-medium-contact materials	CW614N nickelled	
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Switching output	transistor output "Push-Pull" (resistant to short circuits and reversed polarity protected) I _{out} = 100 mA max.	
Electrical connection	for round plug connector M12x1, 4-pole	
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)	
Ingress protection	IP 67	
Weight	see table "Dimensions and weights"	
Conformity	CE	
Installation location	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the metering and switching range.	

Product Information

Sensors and Instrumentation

Ranges

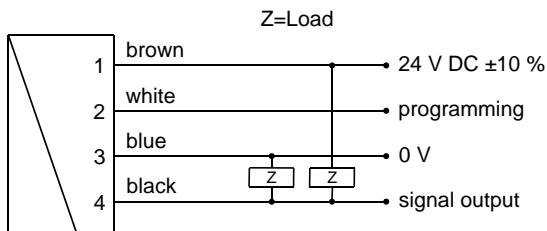
For metering ranges, the details in the table correspond to horizontal inwards flow with increasing flow rate.

Standard type LABO-HR2E

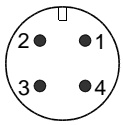
Metering range l/min H ₂ O	Q _{max.} recommended
5 - 60	300 l/min
10 - 100	300 l/min
15 - 200	300 l/min
25 - 300	300 l/min

Special ranges are available.

Wiring



Connection example: PNP NPN



Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring.

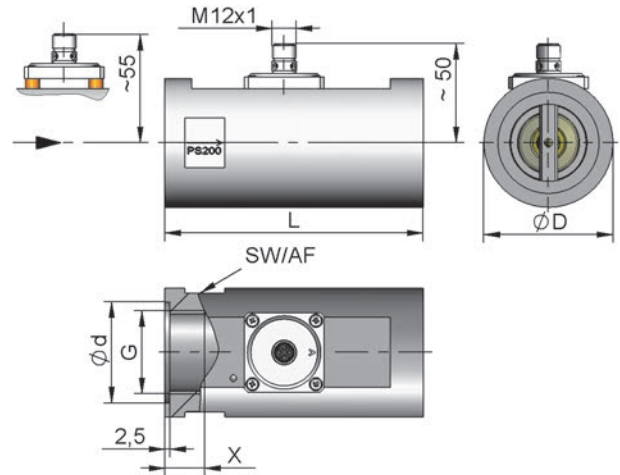
The Push-Pull output can as desired be switched as a PNP or an NPN output.

Dimensions and weights

..including LABO electronics

DN	G	Types	L	ØD	SW	Ød	X	Weight kg
32	G 1 ¹ / ₄	HR2E -032GM	130	65	60	51	23	2.6
40	G 1 ¹ / ₂	HR2E -040GM	170	65	60	56	24	3.2
50	G 2	HR2E -050GM	185	80	75	70	26	5.3

High temperature



Handling and operation

Note

The switching value can be programmed by the user via "teaching". If desired, programmability can be blocked by the manufacturer.

The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

- Include straight calming section of 5 x DN in inlet and outlet.
- Include a filter if the media are dirty (use magnetic filter for ferritic components)

Product Information

Sensors and Instrumentation

Operation and programming

The switching value is set as follows:

- Apply the flow rate to be set to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

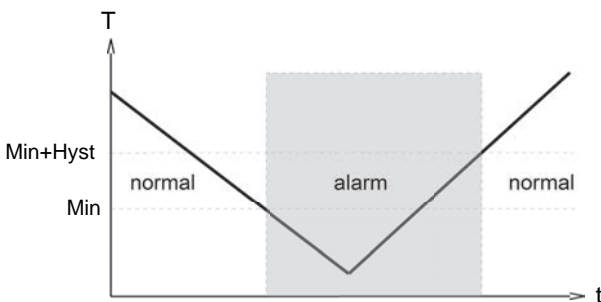
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

To avoid the need to transit to an undesired operating status for the purpose of teaching, the device can be provided ex-works with a teach-offset. The teach-offset point is added to the currently measured value before saving.

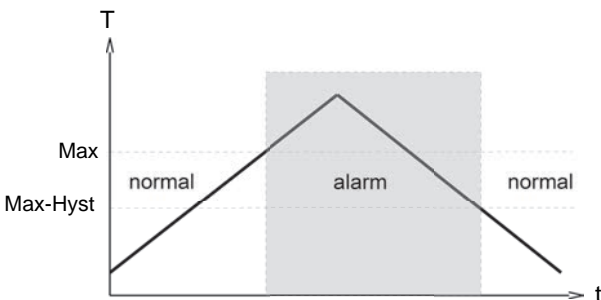
Example: The end of the metering range should be set to 80 %. However, only 60 % can be achieved without problem. In this case, the device would be ordered with a "teach-offset" of +20 %.. At a flow rate of 60 % in the process, teaching would then store a value of 80 %.

The LABO-HR2E-S limit switch can be used to monitor minimal or maximal.

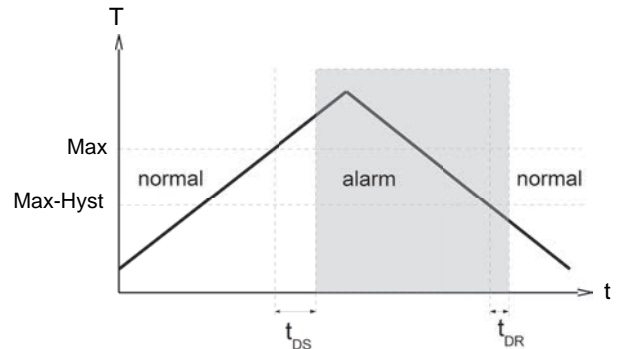
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.

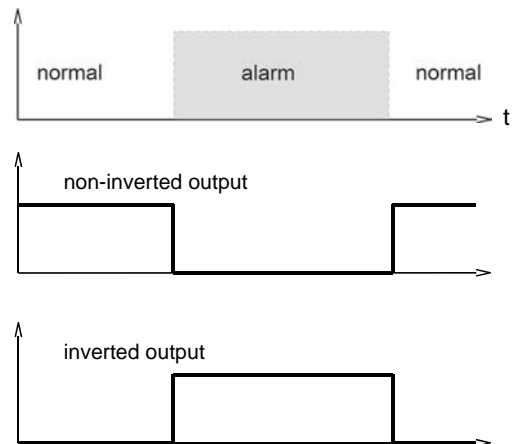


A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.

In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On-Delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Product Information

Sensors and Instrumentation

Ordering code

The basic device is ordered e.g. HR2E-032GM100 with electronics e.g. LABO-HR2E-SPLISD

1. 2. 3. 4.
HR2E - **G**

5. 6. 7. 8. 9. 10.
LABO - HR2E - **S** **S** **D**

○=Option

1. Nominal width	
032	DN 32 - G 1 ¹ / ₄
040	DN 40 - G 1 ¹ / ₂
050	DN 50 - G 2
2. Process connection	
G	female thread
3. Connection material	
M	brass
K	stainless steel
4. HR2E - Metering range H₂O for horizontal inwards flow	
060	5 - 60 l/min
100	10 - 100 l/min
200	15 - 200 l/min
300	25 - 300 l/min

5. Switching output (Limit switch)	
S	Push-Pull (compatible with PNP and NPN)
6. Programming	
P	programmable (teaching possible)
N	<input type="radio"/> cannot be programmed (no teaching)
7. Switching function	
L	minimum-switch
H	maximum-switch
8. Switching signal	
O	standard
I	<input type="radio"/> inverted
9. Electrical connection	
S	for round plug connector M12x1, 4-pole
10. Optional	
D	medium temperature up to 120 °C (with spacers)

LABO options

Switching delay period (0.0..99.9 s) . s
(from Normal to Alarm)

Switch-back delay period (0.0..99.9 s) . s
(from Alarm to Normal)

Power-On delay period (0..99 s) s
(After connecting the supply, time during which the switching output is not activated)

Switching output fixed at l/min

Switching hysteresis %
Standard = 2 % of the metering range

Teach-offset %
(in percent of the metering range)
Standard = 0 %

Further options available on request.

HR2E options

- Special values

Further options available on request.

Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- Converter OMNI-TA
- Device configurator ECI-1

Flow transmitter LABO-HR2VE-I / U / F / C



- Optimised for use with oil
- 4..20 mA output linearised
- 0..10V output linearised
- Frequency output proportional, linear
- Programmable through teaching
- LED for status display
- All metal housing
- Fully potted IP 67
- All parameters programmable via USB interface ECI-1

Characteristics

Mechanical flow switch, for fluid media, with spring-supported piston and magnetic triggering of Hall sensors. Robust construction in brass or stainless steel.

The LABO electronics make various output signals available:

- Analog signal 0/4...20 mA (LABO-HR2VE-...I)
- Analog signal 0/2..10 V (LABO-HR2VE-...U)
- Frequency signal (LABO-HR2VE-...F) or
- A value signal Pulse / x Litres (LABO-HR2VE-...C)

A model with switching output is also available.


If desired, the range end value can be set to the currently existing flow using "teaching".

Technical data

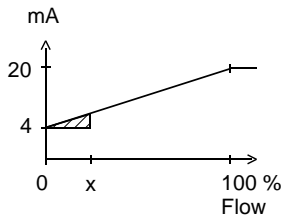
Sensor	analog Hall sensors	
Nominal width	DN 32 / 40 / 50	
Process connection	female thread G 1 1/4..G 2 (further process connections available on request)	
Metering range	10..160 l/min	For details see table "Ranges"
Pressure loss	~ 4..7 bar at Q _{max}	
Q_{max}	up to 160 l/min	
Tolerance	±10 % of full scale value at constant viscosity	
Viscosity-stability	mean deviation ±7 %, max. 18 % (20-330 mm ² /s) of full scale value	
Pressure resistance	PS 200 bar	
Medium temperature	-20..+85 °C, optionally -20..+120 °C	
Ambient temperature	-20..+70 °C	
Media	oil	
Wiring	see section "Wiring"	
Materials medium-contact	<i>Brass construction:</i> CW614N nickelled, CW614N, 1.4305, 1.4310, hard ferrite	<i>Stainless steel construction:</i> 1.4571, 1.4310, hard ferrite
Non-medium-contact materials	CW614N nickelled	
Power supply	18..30 V DC	
Power consumption	< 1 W	
Outputs	<p>LABO-...I: Current output 4..20 mA (alternatively 0..20 mA) Max. load 500 Ohm</p> <p>LABO-...U: Voltage output 0..10 V (alternatively 2..10 V) Load min. 1 kOhm</p> <p>LABO-...F: Frequency output Transistor output "Push-Pull" (resistant to short circuits, and reversed polarity protected) I_{out} = 100 mA max. Selectable frequency, max. 2 kHz</p> <p>LABO-...C: Transistor output "Push-Pull" I_{out} = 100 mA max. Pulse width 50 ms Pulse/Value is to be specified when ordering</p>	
Electrical connection	for round plug connector M12x1, 4-pole	
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)	
Ingress protection	IP 67	
Weight	see table "Dimensions and weights"	
Conformity	CE	
Installation location	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the metering and switching range.	

Product Information

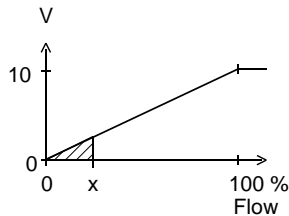
Signal output curves

Value x = Begin of the specified range
 = not specified range

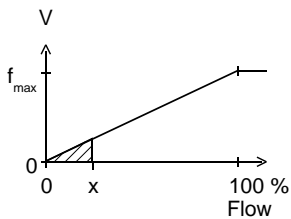
Current output



Voltage output



Frequency output



f_{max} selectable in the range of up to 2000 Hz

Other characters on request.

Ranges

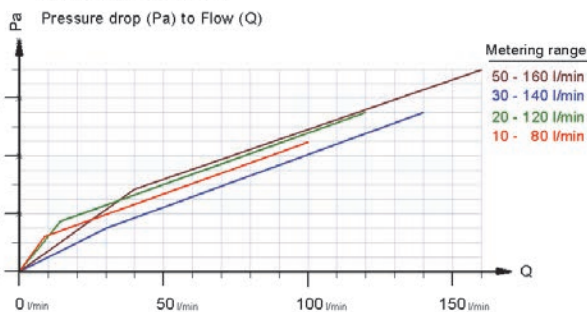
Details in the table correspond to metering ranges with horizontal inwards flow and increasing flow rate.

Standard type LABO-HR2VE

Metering range l/min oil 20-330 mm ² /s	Q_{max} . Recommended l/min	Pressure loss bar at Q_{max} . oil
10 - 80	100	4
20 - 120	120	5
30 - 140	140	5
50 - 160	160	7

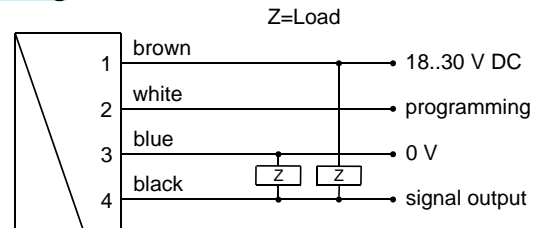
Special ranges are available.

Reference Data:

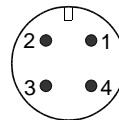


Metering spaces of the flow switch HR2VK1

Wiring



Connection example: PNP NPN



Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring.

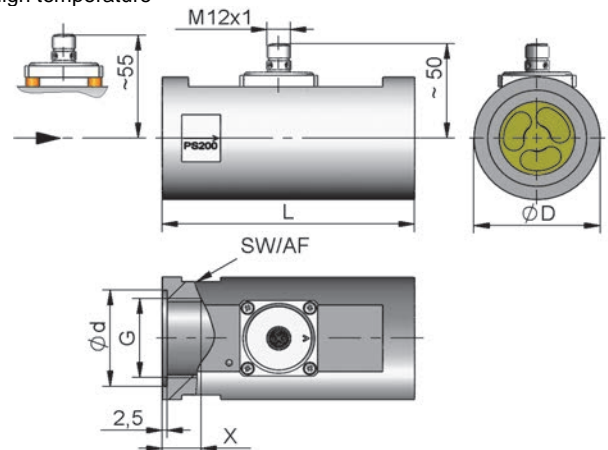
The Push-Pull output can as desired be switched as a PNP or an NPN output.

Dimensions and weights

..including LABO-electronics

DN	G	Types	L	ØD	SW	Ød	X	Weight kg
32	G 1 ¹ / ₄	HR2VE-032GM	130	65	60	51	23	2.6
40	G 1 ¹ / ₂	HR2VE-040GM	170	65	60	56	24	3.2
50	G 2	HR2VE-050GM	185	80	75	70	26	5.3

High temperature



Product Information

Sensors and Instrumentation

Handling and operation

Note

The metering range end value can be programmed by the user via "teaching". Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed.

The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

The teaching option is not available for LABO-HR2VE-C.

- Include straight calming section of 5 x DN in inlet and outlet.
- Include a filter if the media are dirty (use magnetic filter for ferritic components)
- Under unfavorable pressure conditions, e.g. with a free outlet, there is a risk of cavitation.

Operation and programming

The teaching process can be carried out by the user as follows:

- The flow rate to be set is applied to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When teaching has been successfully completed, pin 2 should be connected to 0 V, so as to prevent unintended programming.

The devices have a yellow LED which flashes during the programming pulse. During operation, the LED serves as a display for operating voltage (for analog output) or of switching status (for frequency or pulse output).

To avoid the need to transit to an undesired operating status for the purpose of teaching, the device can be provided ex-works with a teach-offset. The teach-offset point is added to the currently measured value before saving. The offset point can be positive or negative.

Example: The end of the metering range should be set to 80 %. However, only 60 % can be achieved without problem. In this case, the device would be ordered with a "teach-offset" of +20%.. At a flow rate of 60 % in the process, teaching would then store a value of 80 %.

There are many more parameters which can be programmed by the ECI-1 device configurator if necessary.

Ordering code

The basic device is ordered e.g. HR2VE-032GM100 with electronics e.g. LABO-HR2VE-CPSD

HR2VE - 1. 2. **G** 3. 4.

LABO - HR2VE - 5. 6. 7. **S** 8.

○=Option

1. Nominal width	
032	DN 32 - G 1 ¹ / ₄
040	DN 40 - G 1 ¹ / ₂
050	DN 50 - G 2
2. Process connection	
G	female thread
3. Connection material	
M	brass
K	stainless steel

4. HR2VE - Metering range H₂O for horizontal inwards flow	
080	10.. 80 l/min
120	20..120 l/min
140	30..140 l/min
160	50..160 l/min
5. Signal output	
I	current output 4..20 mA
U	voltage output 0..10 V
F	frequency output
C	pulse output
6. Programming	
N	cannot be programmed (no teaching)
P	<input type="radio"/> full scale value can be programmed (teaching possible)
7. Electrical connection	
S	for round plug connector M12x1, 4-pole
8. Optional	
D	<input type="radio"/> medium temperature up to 120 °C (with spacers)

Required ordering information

For LABO-HR2VE-...F:

Output frequency at full scale

Hz

Maximum value: 2000 Hz

For LABO-HR2VE-...C:

The volume must be specified for the pulse output version (with numerical value and unit) which will correspond to one pulse.

Volume per pulse (numerical value)

Volume per pulse (unit)

Options LABO

Special range for analog output:

l/min

<= Metering range
(Standard=Metering range)

Special range for frequency output:

l/min

<= Metering range
(Standard=Metering range)

Power-On delay period (0..99 s)

s

(time after applying power during which the outputs are not activated or set to defined values)

Teach-offset

%

(in percent of the metering range)

Standard = 0 %

Options HR2VE

- Special values

Further options available on request.

Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- Converter OMNI-TA
- Device configurator ECI-1

Flow switch LABO-HR2VE-S



- Optimized for use with oil
- Versatile, configurable switching output in Push-Pull model (small hysteresis possible)
- Programmable through teaching
- LED for status display
- All metal housing
- Fully potted IP 67
- All parameters programmable via USB interface ECI-1

Characteristics

Mechanical flow switch, for oil, with spring-supported piston and magnetic triggering of Hall sensors. Robust construction in brass or stainless steel.

The LABO electronics fitted to the device make available an electronic switching output (Push-Pull) with adjustable characteristics (minimum/maximum) and hysteresis, which responds when an adjustable limit is fallen short of or exceeded.

If desired, the switching value can be set to the currently existing flow using "teaching". Models with analog or pulse output are also available (see separate data sheets).

In contrast to electromechanical switches (Reed contacts or microswitches), electronic switches are insensitive to impact and wear.

There is no galvanic separation from the supply circuit.

Technical data

Sensor	analog Hall sensors	
Nominal width	DN 32 / 40 / 50	
Process connection	female thread G 1 1/4..G 2 (further process connections available on request)	
Metering range	10..160 l/min	for details see table "Ranges"
Pressure loss	~ 4..7 bar at Q _{max}	
Q_{max}	up to 160 l/min	
Measurement accuracy	±5 % of full scale value at constant viscosity	
Viscosity-stability	±10 % of full scale value (20-330 mm ² /s)	
Pressure resistance	PS 200 bar	
Medium temperature	-20..+85 °C, optionally -20..+120 °C	
Ambient temperature	-20..+70 °C	
Media	oil	
Wiring	see section "Wiring"	
Materials medium-contact	<i>Brass construction:</i> CW614N nickelled, CW614N, 1.4305, 1.4310, hard ferrite	<i>Stainless steel construction:</i> 1.4571, 1.4310, hard ferrite
Non-medium-contact materials	CW614N nickelled	
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Switching output	transistor output "Push-Pull" (resistant to short circuits and reversed polarity protected) I _{out} = 100 mA max.	
Electrical connection	for round plug connector M12x1, 4-pole	
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)	
Ingress protection	IP 67	
Weight	see table "Dimensions and weights"	
Conformity	CE	
Installation location	Standard: horizontal inwards flow; other installation positions are possible; the installation position affects the metering and switching range.	

Product Information

Sensors and Instrumentation

Ranges

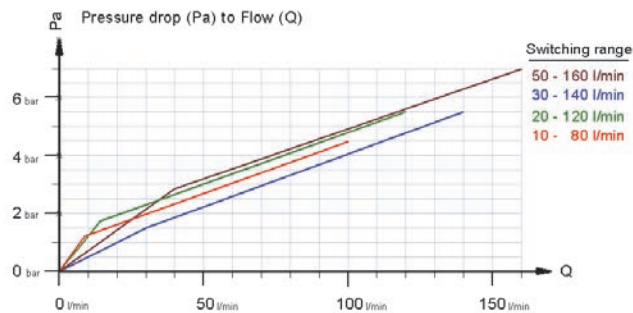
For metering ranges, the details in the table correspond to horizontal inwards flow with increasing flow rate.

Standard type LABO-HR2VE

Switching range l/min oil 20-330 mm ² /s	Q _{max.} Recommended l/min	Pressure loss bar at Q _{max.} oil
10 - 80	100	4
20 - 120	120	5
30 - 140	140	5
50 - 160	160	7

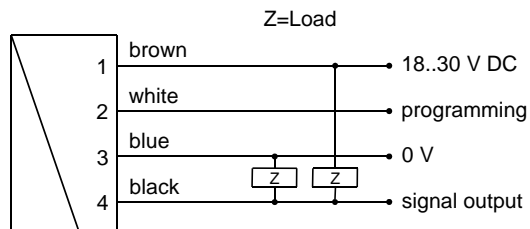
Special ranges are available.

Reference Data:

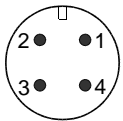


Switching spaces of the flow switch HR2VK1

Wiring



Connection example: PNP NPN



Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring.

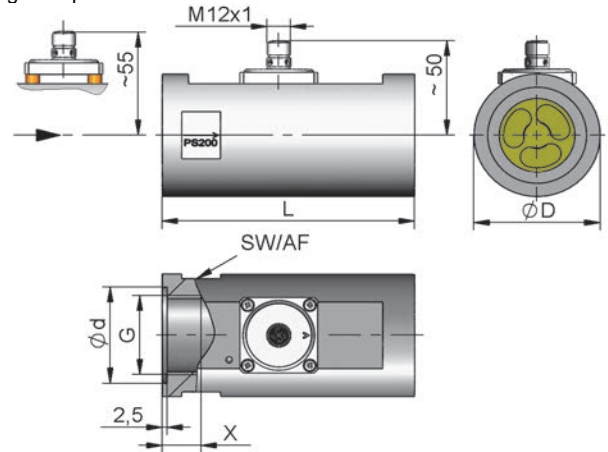
The Push-Pull output can as desired be switched as a PNP or an NPN output.

Dimensions and weights

..including LABO-electronics

DN	G	Types	L	ØD	SW	Ød	X	Weight kg
32	G 1 ¹ / ₄	HRVE-032GM	130	65	60	51	23	2.6
40	G 1 ¹ / ₂	HRVE-040GM	170	65	60	56	24	3.2
50	G 2	HRVE-050GM	185	80	75	70	26	5.3

High temperature



Handling and operation

Note

The switching value can be programmed by the user via "teaching". If desired, programmability can be blocked by the manufacturer.

The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

- Include straight calming section of 5 x DN in inlet and outlet.
- Include a filter if the media are dirty (use magnetic filter for ferritic components)
- Under unfavorable pressure conditions, e.g. with a free outlet, there is a risk of cavitation.

Product Information

Sensors and Instrumentation

Operation and programming

The switching value is set as follows:

- Apply the flow rate to be set to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

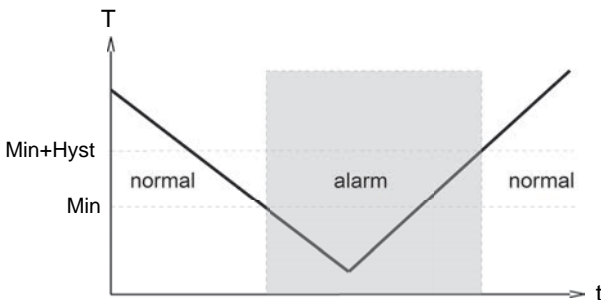
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

To avoid the need to transit to an undesired operating status for the purpose of teaching, the device can be provided ex-works with a teach-offset. The teach-offset point is added to the currently measured value before saving.

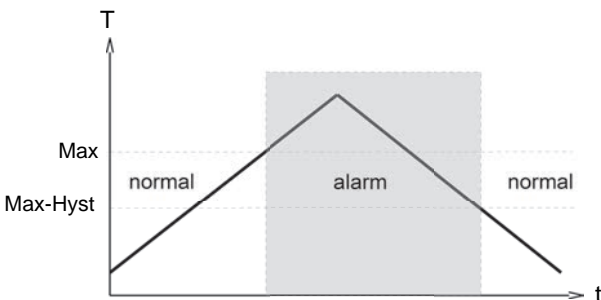
Example: The end of the metering range should be set to 80 %. However, only 60 % can be achieved without problem. In this case, the device would be ordered with a "teach-offset" of +20%.. At a flow rate of 60 % in the process, teaching would then store a value of 80 %.

The LABO-HR2VE-S limit switch can be used to monitor minimal or maximal.

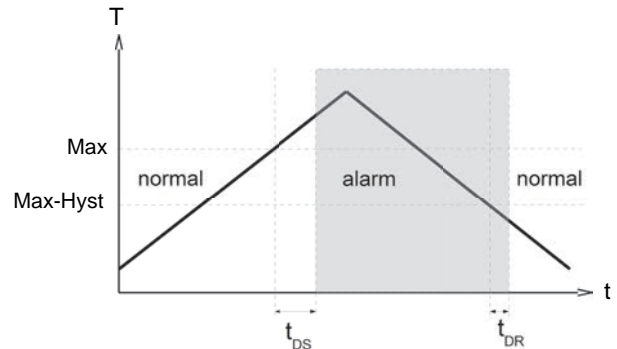
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.

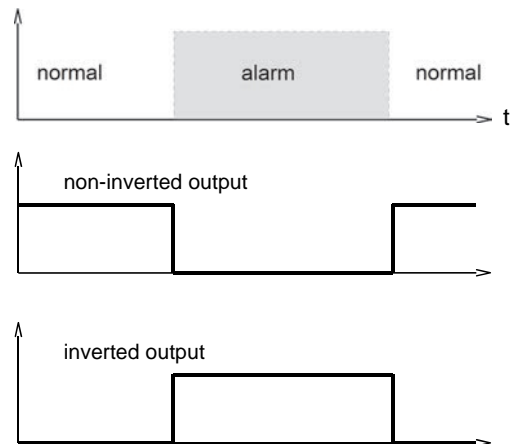


A switchover delay time (t_{DS}) can be applied to the switchover to the alarm state. Equally, one switch-back delay time (t_{DR}) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.

In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On-Delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

Product Information

Sensors and Instrumentation

Ordering code

The basic device is ordered e.g. HR2VE-032GM100 with electronics e.g. LABO-HR2VE-SPLISD

HR2VE - 1. 2. 3. 4. G

LABO - HR2VE - 5. 6. 7. 8. 9. 10. S D

○=Option

1. Nominal width	
032	DN 32 - G 1 ¹ / ₄
040	DN 40 - G 1 ¹ / ₂
050	DN 50 - G 2
2. Process connection	
G	female thread
3. Connection material	
M	brass
K	stainless steel
4. HR2VE - Metering range H₂O for horizontal inwards flow	
080	10.. 80 l/min
120	20..120 l/min
140	30..140 l/min
160	50..160 l/min

5. Switching output (Limit switch)	
S	Push-Pull (compatible with PNP and NPN)
6. Programming	
P	programmable (teaching possible)
N	<input type="radio"/> cannot be programmed (no teaching)
7. Switching function	
L	minimum-switch
H	maximum-switch
8. Switching signal	
O	standard
I	<input type="radio"/> inverted
9. Electrical connection	
S	for round plug connector M12x1, 4-pole
10. Optional	
D	medium temperature up to 120 °C (with spacers)

Options LABO

Switching delay period (0.0..99.9 s) . s
(from Normal to Alarm)

Switch-back delay period (0.0..99.9 s) . s
(from Alarm to Normal)

Power-On delay period (0..99 s) s
(After connecting the supply, time during which the switching output is not activated)

Switching output fixed at l/min

Switching hysteresis %
Standard = 2 % of the metering range

Teach-offset %
(in percent of the metering range)
Standard = 0 %

Further options available on request.

Options HR2VE

- Special values

Further options available on request.

Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- Converter OMNI-TA
- Device configurator ECI-1

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