

Level- and temperature switch

Nivovent NV 71, NV 71D

The oil tank is the key component of hydraulic and lubrication systems. The operating oil is removed from the tank and then returned to it. Depending on what the system is used for, the levels in the oil tank can fluctuate to varying degrees. In most applications, the level fluctuations result in an exchange of the vapour phase above the oil level with the ambient air. Therefore, virtually all oil tanks are equipped with a so-called air breather, to prevent contaminants in the ambient air from entering the system.

To reduce costs and space requirements, a number of other system-related functions such as liquid level and temperature monitoring are also combined in the air breather in the Nivovent series.

NV 71

Connecting flange as per DIN 24557 Part 2

Qualified vent filter with replaceable element

Various plug options

Up to 4 switching outputs or 2 switching outputs for liquid level plus Pt100 or analog output for temperature

Proven and tested highly dynamic float system

Sensor length up to 1.5 m (4.92 ft) (longer upon request)

Suitable for up to 230 V DC

NV 71D

LED display with switching output status

Qualified vent filter with replaceable element

Visual air breather monitoring optional

Alternatively, continuous temperature output signal (configurable to current or voltage) plus one freely programmable switching output

Characteristics of switching outputs configurable as window or hysteresis

Two switching outputs configurable as frequency output (1-100 Hz)

Standard menu structure based on VDMA standard specification 24574 ff

Min/max value memory, logbook function



Technical Data NV 71

Basic unit

Version	MS	VA
Operating pressure	max. 1 bar (14.5 psi)	max. 1 bar (14.5 psi)
Operating temperature	-20 °C to +80 °C (-4 °F to 176 °F)	-20 °C to +80 °C (-4 °F to 176 °F)
Float	SK 610	SK 221
Min. fluid density	0.80 kg/dm ³ (0.029 lb/in ³)	0.85 kg/dm ³ (0.031 lb/in ³)
Lengths (all versions)	280 mm (11.02 in), 370 mm (14.57 in), 500 mm (19.69 in) (standard), variable to max. 1500 mm (59.06 in) in 10 mm (0.39 in) increments	

Material/Version

Float	rigid PU	1.4571
Immersion tube	Brass	1.4571
Flange (DIN 24557)	PA	PA
Weight at L=280 mm (11.02 in)	approx. 790 g (1.74 lb)	approx. 870 g (1.92 lb)
Each 100 mm (3.94 in) add	approx. 30 g (0.06 lb)	approx. 50 g (0.11 lb)

Options

Stilling tube (SSR)	Brass	VA
---------------------	-------	----

Vent filter

Filter fineness	3 µm
Additional equipment	Filler cap – n/a with filling adapter

Level switching output	K10	W11
Function	NO/NC*	Change-over contact
Voltage max.	230 V AC/DC**	48 V AC/DC**
Switching current max.	0.5 A	0.5 A
Contact load max.	10 VA	20 VA
Min. contact spacing	40 mm (1.57 in)	40 mm (1.57 in)
Contact position in 10 mm (0.39 in) increments		

*NO = falling NC contact / NC = falling NO contact

**for configuration with temperature transmitter KT max. 30 V DC

Optional temperature switching outputs TK	TM			
Number of temp. contacts	1		2	
Voltage max.	230 V AC/DC		230 V AC/DC	
Switching current max.	2.5 A		2 A	
Contact load max.	100 VA		100 VA	
Function	NO*	NC*	NO	NC
Switching point °C	50/60/70/80 °C (122/140/158/176 °F)	50/60/70/80 °C (122/140/158/176 °F)	50/60/70/80 °C (122/140/158/176 °F)	50/60/70/80 °C (122/140/158/176 °F)
Switching point - tolerance	± 3 K	± 3 K	± 5 K	± 5 K
Hysteresis max.	10 K ± 3 K	10 K ± 3 K	26/35/40/45 K ± 5 K	18 K ± 5 K

*NO = NO contact / NC = NC contact

Data for rising temperature. Other temperatures and versions with 2 x TK contact available upon request

Temperature sensor

Temperature sensor	Pt 100 Class B, DIN EN 60 751
	Tolerance $\pm 0.8^{\circ}\text{C}$ (1.44°F)

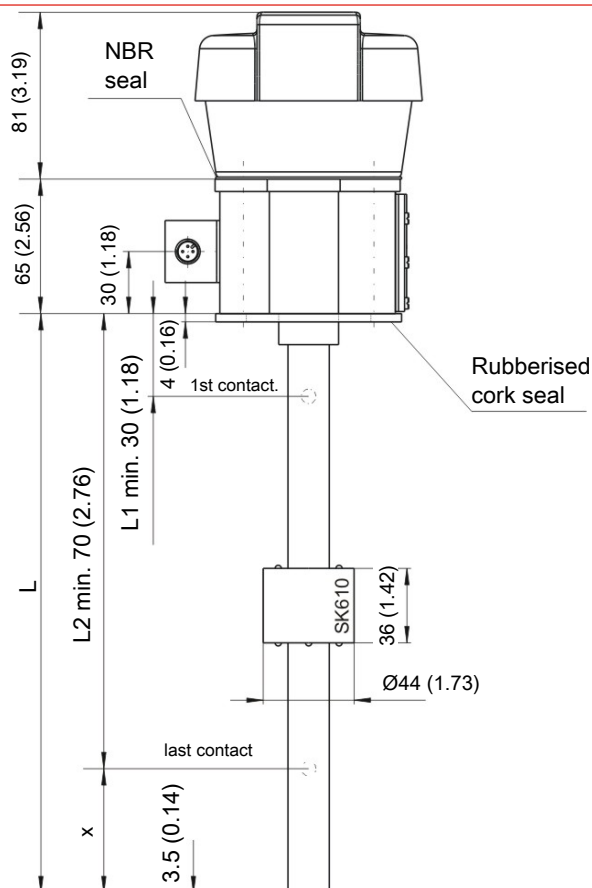
Temperature transmitter

KT

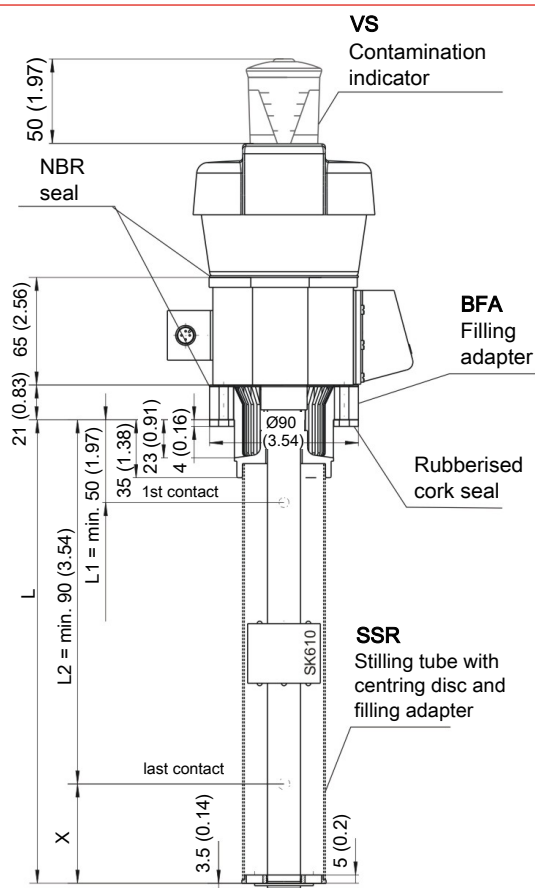
Temperature sensor	Pt100 Class B, DIN EN 60 751
Measuring range	0°C to $+100^{\circ}\text{C}$ (32°F to 212°F)
Operating voltage (U_B)	10 - 30 V DC
Output	4 - 20 mA
Burden Ω max.	$= (U_B - 7.5 \text{ V}) / 0.02 \text{ A}$
Accuracy	$\pm 1\%$ from end value
Other measuring ranges available upon request	

Dimensions NV 71

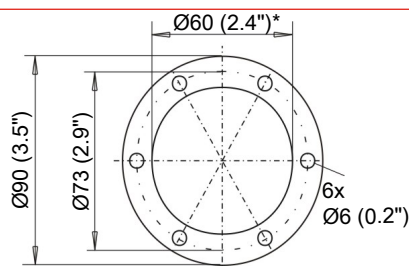
Basic version



With options

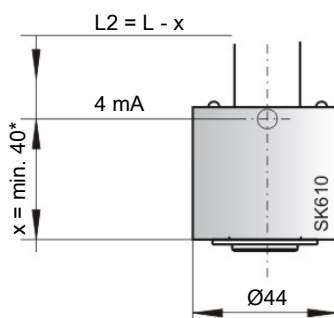


Flange drawing



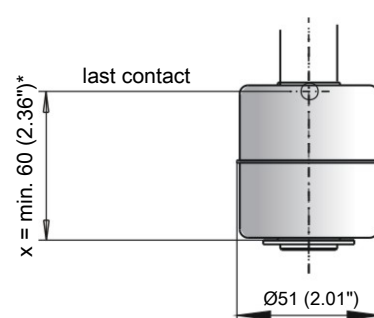
*min. Ø61 (2.4'') for VA version with stilling tube

SK 610 float for NV 71--MS



* min. 80 with temperature

SK 221 float for NV 71-VA



* min. 80 (3.14'') with temperature

Ordering instructions NV 71

Options / Accessories

VS	Visual air breather clogging indicator : Analogue underpressure indicator, display range 0.35 bar (5.1 psi).
BFA*	Filling adapter incl. ribbed flange with sieve insert: This option allows adding small oil quantities via the air breather housing. The corresponding housing is therefore equipped with that version.
SSR*	Stilling tube with support ring and filling adapter: This includes the optional stilling tube as well as the same filling option as the BFA. The stilling tube is made of the same material as the requested immersion tube (MS/VS).
MT	For integration in Multiterminal : The basic unit will be mounted to the Multiterminal (MT). For specification please refer to the Multiterminal data sheet.
MTS	For integration in Multiterminal including stilling tube : In addition to the basic unit, a stilling tube with centring rod is installed in the Multiterminal.
FCT	Fluid control terminal : Here the fluid control terminal (FCT) mounts directly onto the basic version. For details please refer to the fluid control terminal data sheet.

* not available in conjunction with FCT and MT/MTS option.

Type plate

Type designation, NV 71-HY-□□-□□-nn-□□-□□-□□-□□-□□	Options
HY filter	VS Contamination indicator
Version	BFA ³⁾ Filling adapter
MS Brass	SSR ³⁾ Stilling tube incl. filling adapter
VA ¹⁾ float / VA immersion tube	MT for multiterminal
Plug connector	MTS for multiterminal with stilling tube option
M3	FCT for Fluidcontrolterminal
S6	2nd temperature contact (TM... only)
M12	NC contact NO contact
2M12	TM... TM50NC TM50NO = 50 °C (122 °F)
Length in mm (in) (max. 1500/(59.06))	TM60NC TM60NO = 60 °C (140 °F)
280 (11.02) Standard lengths	TM70NC TM70NO = 70 °C (158 °F)
370 (14.57)	TM80NC TM80NO = 80 °C (176 °F)
500 (19.69)	1st temperature signal
nnn variable, please specify value	NC contact NO contact
Level measurement	TK... TK50NC TK50NO = 50 °C (122 °F)
1-4 Number of contacts ²⁾	TK60NC TK60NO = 60 °C (140 °F)
Level contacts	TK70NC TK70NO = 70 °C (158 °F)
K Model K10 (NC/NO)	TK80NC TK80NO = 80 °C (176 °F)
W Model W11 (change-over contact)	TM ⁶⁾ TM50NC TM50NO = 50 °C (122 °F)
	TM60NC TM60NO = 60 °C (140 °F)
	TM70NC TM70NO = 70 °C (158 °F)
	TM80NC TM80NO = 80 °C (176 °F)
	Pt100 Temperature sensor ⁴⁾
	KT Temperature transmitter ^{4) 5)}

¹⁾ Not in conjunction with option FCT

²⁾ Please specify position and switching function per model key, Example: L1 = nnn mm NC

³⁾ not in conjunction with FCT, MT or MTS option

⁴⁾ Cannot be combined with temperature contact

⁵⁾ With KT only 10 - 30 V DC

⁶⁾ For version with two temperature contacts

Accessories

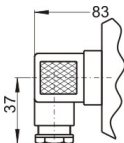
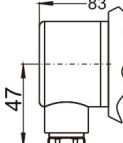
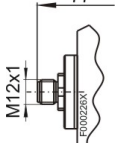
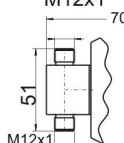
Item no.	Description
9144050010	Connecting cable M12x1, 4-pin, 1.5 m (4.9 ft), angular coupling and straight plug
9144050046	Connecting cable M12x1, 4-pin, 3.0 m (9.8 ft), angular coupling and straight plug
9144050047	Connecting cable M12x1, 4-pin, 5.0 m (16.4 ft), angular coupling and strands

Ordering example

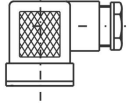
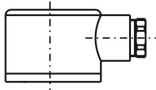
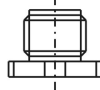
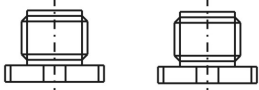
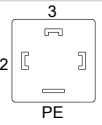
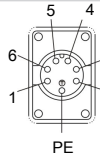
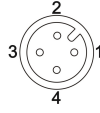
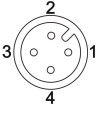
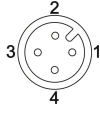
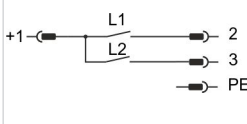
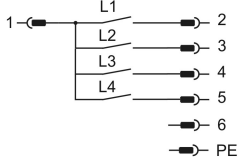
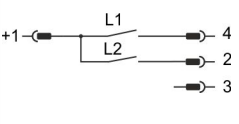
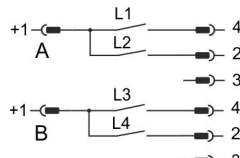
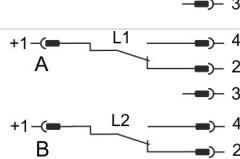
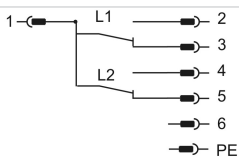
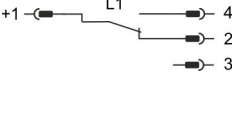
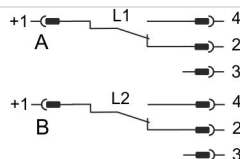
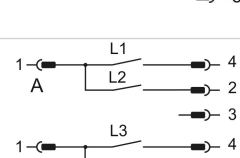
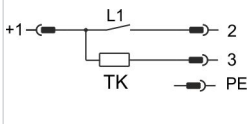
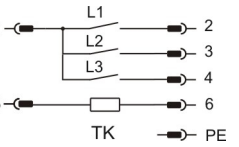
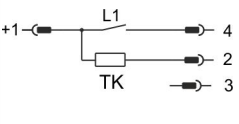
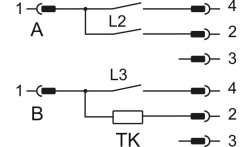
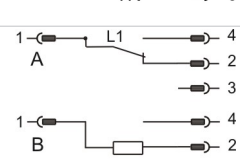
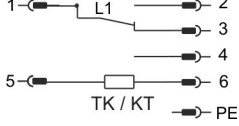
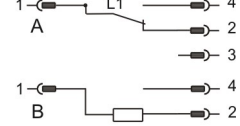
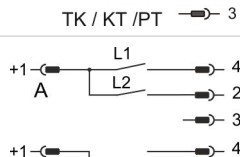
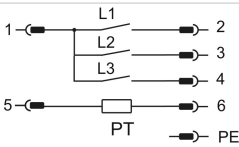
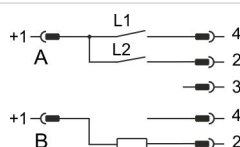
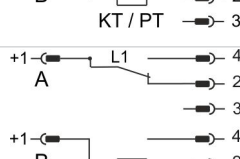
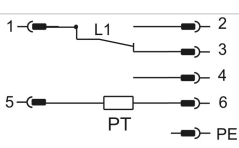
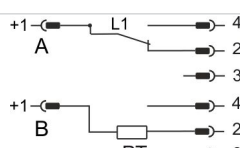
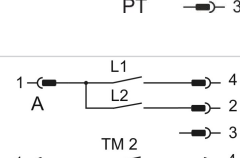
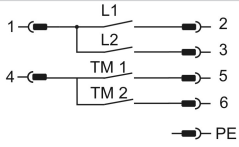
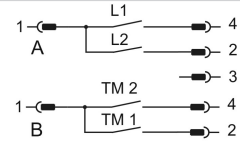
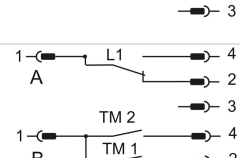
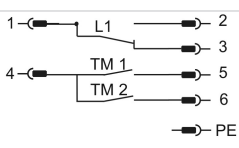
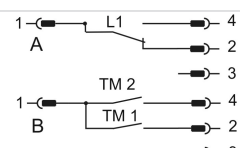
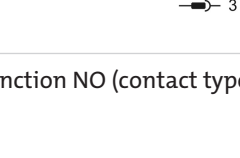
You require:	Brass level switch with vent filter and contamination indicator, L=500 mm (19.69 in), 2 level contacts and temperature contact TK80 °C (TK176 °F) as NC contact, 1st contact: 100 mm (3.94 in) falling NO contact. 2nd contact: 420 mm (16.54 in) falling NC contact.
Order:	NV 71-HY-MS-S6-500-2K-TK80NC-VA, L1=100 NC, L2=420 NO

Standard pin assignment NV 71

Plug connection

	M3	S6	M12 (base)	2xM12 (base)
Dimensions				
Number of pins	3-pin + PE	6-pin + PE	4-pin	4-pin / 4-pin
DIN EN	175301-803		61076-2-101	61076-2-101
Max. voltage	230 VAC/DC*	230 V AC/DC*	30 VDC	30 VDC
IP rating	IP65	IP65	IP67**	IP67**
Cable fitting	PG 11	M20 x 1.5		
Max. Number of contacts				
Level/temp. contacts	1 x K10 / 1 x TK - / - - / -	3 x K10 / 1 x TK 2 x K10 / 2 x TM 1 x W11 / 1 x TK 1 x W11 / 2 x TM	1 x K10 / 1 x TK - / - - / -	3 x K10 / 1 x TK 2 x K10 / 2 x TM 1 x W11 / 1 x TK 1 x W11 / 2 x TM
Level contacts only	2 x K10 1 x W11	4 x K10 2 x W11	2 x K10 1 x W11	4 x K10 2 x W11

*Max. 48 V AC/DC for change-over contact. **with IP67 cable box attached. Other plug connections available upon request.

	M3	S6	M12 (base)	2 x M12 (base)
				
Connection schematic				Plug A  Plug B 
K10 Level contact(s)				Plug A  Plug B 
W11 Level contact(s)				Plug A  Plug B 
K10 Level- and temperature contact				Plug A  Plug B 
W11 Level- and temperature contact(s)				Plug A  Plug B 
K10 / Pt100 Level- and temperature contact(s)				Plug A  Plug B 
W11 / Pt100 Level- and temperature contact(s)				Plug A  Plug B 
K10 Level and 2 x temperature contact(s)				Plug A  Plug B 
W11 Level and 2 x temperature contact(s)				Plug A  Plug B 

The standard assignment specified here refers to the max. number of contacts possible and contact function NO (contact type K10).

Technical Data NV 71D

Basic unit

Version	MS	VA
Operating pressure	max. 1 bar (14.5 psi)	max. 1 bar (14.5 psi)
Operating temperature	-20 °C to +80 °C (-4 °F to 176 °F)	-20 °C to +80 °C (-4 °F to 176 °F)
Float	SK 610	SK 221
Min. fluid density	0.80 kg/dm ³ (0.029 lb/in ³)	0.85 kg/dm ³ (0.031 lb/in ³)
Lengths (all versions)	280 mm (11.02 in), 370 mm (14.57 in), 500 mm (19.69 in) (Standard), variable to max. 1500 mm (59.06 in) in 10 mm (0.39 in) increments	

Material/Version

Display housing	PA	PA
Float	rigid PU (SK 601)	1.4571 (SK 221)
Immersion tube	Brass	1.4571
Flange (DIN 24557)	PA	PA
Weight at L=280 mm	approx. 825 g (1.82 lb)	approx. 910 g (2.01 lb)
Each 100 mm add	approx. 30 g (0.06 lb)	approx. 50 g (0.11 lb)
Degree of protection	IP65	IP65

Includes:

Mounting screws (quantity 6) and rubberised cork seal

Options

Stilling tube (SSR)	Brass	VA
---------------------	-------	----

Vent filter

All versions HY type Hydac BF 7

Filter fineness	3 µm
Additional equipment	Filler cap – n/a with filling adapter

Temperature display electronics

Display	4 character 7 segment LED
Operation	Via 3 keys
Memory	Min. / Max. Data memory
Starting current input	approx. 100 mA for 100 ms
Current input during operation	approx. 50 mA (without current- and switching outputs)
Supply voltage (U _B)	10 – 30 V DC (nominal voltage 24 V DC)
Ambient temperature	-20 °C to +70 °C (-4 °F to 158 °F)
Display units	Temperature
	°C / °F
Display range	-20 °C to +120 °C (-4 °F to 248 °F)
Alarm setting range	0 °C to +100 °C (32 °F to 212 °F)
Display accuracy	± 1 % from end value

Temperature sensor	Pt 100 Class B, DIN EN 60751 Resolution 0.5 °C (0.9 °F)
--------------------	--

Level switching output

K10

Max. number	2
Function	NC / NC*
Function	NC / NC*
Switching current max.	0.5 A
Contact load max.	10 VA
Min. contact spacing	40 mm (1.57 in)
Contact position in 10 mm (0.39 in) increments	

*NO= falling NC contact / NC = falling NO contact

Temperature outputs

Choose from the following temperature outputs

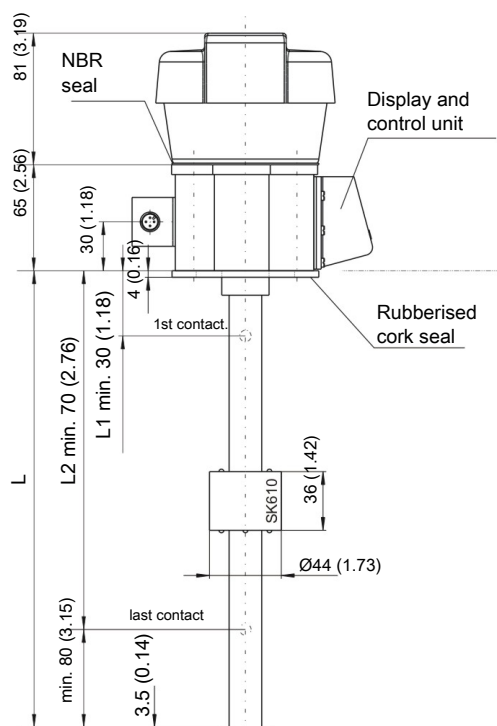
	-2T	-1T-KT	-4T
Plug (base)	2 x M12 – 4-pin	2 x M12 – 4-pin	1 x M12 – 4-pin 1 x M12 – 8-pin
Switching outputs	2 x freely programmable*	1 x freely programmable*	4 x freely programmable
Alarm memory		with 1 x assignable to alarm logbook	with 1 x assignable to alarm logbook
max. switching current**	0.5 A per output continuous short-circuit protected	0.5 A per output continuous short-circuit protected	0.5 A per output continuous short-circuit protected
Contact load	max. 1 A total	max. 1 A total	max. 1 A total
Analogue output		Analogue output	
Max. burden Ω as current output		$= (U_B - 8 \text{ V}) / 0.02 \text{ A}$	
Min. input load as voltage output		10 k Ω	

*also programmable as frequency output

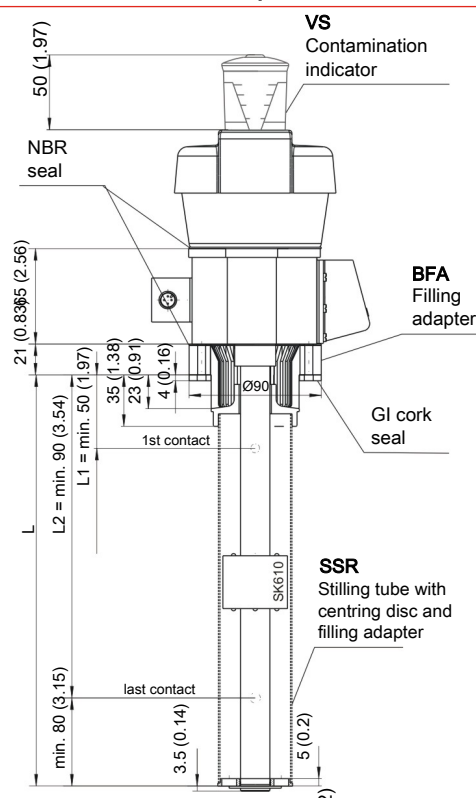
**Output 1 max. 0.2 A.

Dimensions NV 71D

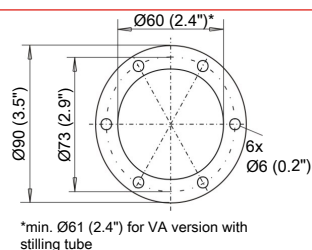
Basic version



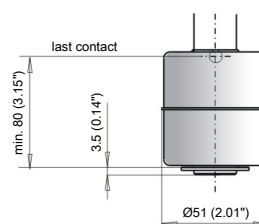
With options



Flange drawing



Float for NV 71D-VA



Ordering instructions NV 71D

Options / Accessories

VS	Visual air breather clogging indicator : Analogue underpressure indicator, display range 0.35 bar (5.1 psi).
BFA*	Filling adapter incl. ribbed flange with sieve insert: This option allows adding small oil quantities via the air breather housing. The corresponding housing is therefore equipped with that version.
SSR*	Stilling tube with support ring and filling adapter: This includes the optional stilling tube as well as the same filling option as the BFA. The stilling tube is made of the same material as the requested immersion tube (MS/VS).
MT	For integration in Multiterminal : The basic unit will be mounted to the Multiterminal (MT). For specification please refer to the Multiterminal data sheet.
MTS	For integration in Multiterminal including stilling tube : In addition to the basic unit, a stilling tube with centring rod is installed in the Multiterminal.
FCT	Fluid control terminal : Here the fluid control terminal (FCT) mounts directly onto the basic version. For details please refer to the fluid control terminal data sheet.

* not available in conjunction with FCT and MT/MTS option.

Model key

Type designation, with display, HY filter	NV 71D-HY-□□-□□-nn-□□-nn-□□-nn-□□-□□-□□-□□	Options
Version		VS Contamination indicator
MS Brass		BFA** Filling adapter
VA ¹⁾ float and VA immersion tube		SSR** Stilling tube incl. filling adapter
Plug connector		MT for multiterminal
S6		MTS for multiterminal with stilling tube option
2M12		FCT for Fluidcontrolterminal
Length in mm (in)		Temperature measurement
Variable, please specify value, max. 1500 (59.06)		2T 2x PNP switching output
Level measurement		4T 4x PNP switching output
1K 1x K10		1T-KT 1x PNP switching output
2K 2x K10		1x analogue output 4-20 mA
1st level contact		Switching function 2nd contact
nn Please specify installation dimensions (L1 in mm/in)		NO falling NC contact
Switching function 1st contact		NC falling NO contact
NO falling NC contact		
NC falling NO contact		2nd level contact (if applicable)
		nn Please specify installation dimensions (L2 in mm/in)

¹⁾ Not in conjunction with FCT option

²⁾ Not in conjunction with FCT, MT or MTS option

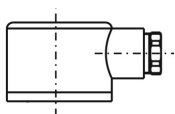
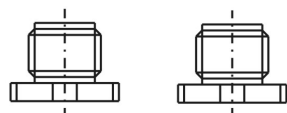
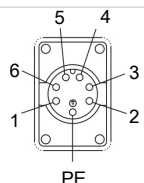
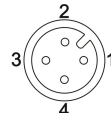
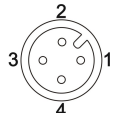
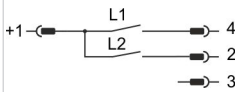
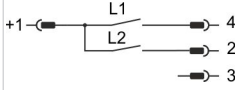
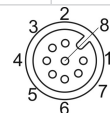
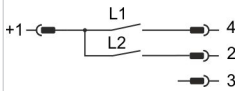
Accessories

Item no. 4-pin	Item no. 8-pin	Description
9144050010	9144050048	Connecting cable M12x1, 1.5 m (4,92 ft), angular coupling and straight plug
9144050046	9144050049	Connecting cable M12x1, 3.0 m (9,84 ft), angular coupling and straight plug
9144050047	9144050033	Connecting cable M12x1, 5.0 m (16,40 ft), angular coupling and strands

Ordering example

You require:	Stainless steel level switch with vent filter and contamination indicator, length L = 500 mm (19.69 in), 2 level contacts, 1st contact: 100 mm (3.94 in) falling NO contact, 2nd contact: 420 mm (16.54 in) falling NC contact, 2 temperature outputs
Order:	NV 71D-HY-VA-2M12-500-2K-100 NC-420 NO-2T-VS

Standard pin assignment NV 71D

Plug connection	S6		2xM12		
					
Connection schematic			Plug A (level)	Plug B (temperature)	
					
2T	Pin			Pin	
2 x temperature output	1	+24 V DC		1	+24 V DC
	2	2 GND		2	2 Analogue (out)
	3	S1 (PNP)		3	GND
	4	S2 (PNP)		4	S1 (PNP)
	5	L1			
	6	(L2)			
1T-KT	Pin			Pin	
1 x temperature output, 1 x analogue output	1	+24 V DC		1	+24 V DC
	2	2 GND		2	2 Analogue (out)
	3	S1 (PNP)		3	GND
	4	Temp (analogue)		4	S1 (PNP)
	5	L1			
	6	(L2)			
Connection schematic					
4T				Pin	
4 x temperature output				1	+24 V DC
				2	S2 (PNP)
				3	GND
				4	S1 (PNP)
				5	S3 (PNP)
				6	S4 (PNP)

When measuring the switching output with high-load measuring device inputs or when used as a frequency output, the load must be set to 10 kΩ between the output and earth (GND) to avoid faulty measurements.