

# Level- and temperature sensor

## Nivovent NV 77-XP

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 77-XP

Connecting flange as per DIN 24557 Part 2

Combined, continuous liquid level and oil temperature monitoring

6 programmable switching outputs assignable as level or temperature signal

Alternatively with IO-Link and 1 x programmable switching output

Alternatively with one analog output each (current/voltage setting) for level and temperature plus 2 or up to 6 freely programmable switching outputs

In normal mode the LED display shows the actual temperature, with status of the switching outputs

Standard menu structure based on VDMA standard sheet 24574 ff.

Characteristics of switching outputs configurable as window or hysteresis

Switching output configurable as frequency output (1-100 Hz)

Min/max memory, logbook function

Proven and tested highly dynamic float system

Immersion tube in matched lengths to max. 1420 mm (55.9 in), other lengths available upon request



**Technical Data NV 77-XP**
**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 604	SK 221
Min. fluid density	0.80 kg/dm <sup>3</sup> (0,029 lb/in <sup>2</sup> )	0.85 kg/dm <sup>3</sup> (0,029 lb/in <sup>2</sup> )
Lengths (all versions)	280 (11 in), 370 (14.6 in), 500 (19.7 in), 670 (26.4 in), 820 (32.3 in), 970 (38.2 in), 1120 (44.1 in), 1270 (50 in), and 1420 (55.9 in) mm (other lengths available upon request)	

**Material/Version**

Display housing	PA	PA
Float	rigid PU	1.4571
Immersion tube	Brass	1.4571
Flange (DIN 24557)	PA	PA
Weight at L=280 mm	approx. 850 g (1.873 lb)	approx. 950 g (2.094 lb)
Each 100 mm add	approx. 30 g (0.066 lb)	approx. 50 g (0.110 lb)
Degree of protection	IP65	IP65

**Options**

Stilling tube (SSR)	Brass	VA
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**Vent filter**
**All versions HY type Hydac BF 7**

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

**Analysis 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 <sub>b</sub> )	10 – 30 V DC (nominal voltage 24 V DC) / with IO-Link 18 – 30 V DC	
Ambient temperature	-20 °C to +70°C (-4 °F to 158 °F)	
Display units	Level %, cm, L, i, Gal	Temperature °C / °F
Display range	adjustable	-20 °C to +120 °C (-4 °F to 248 °F)
Alarm setting range	e.g. 0 – 100 %	0 °C to 100 °C (32 °F to 212 °F)
Display accuracy	± 1 % from end value	± 1 % from end value

**Input values**

	Level	Temperature
Principle of measurement	Reed-contact	Pt100 Cl. B, DIN EN 60751
	Resolution 5 mm (0.197 in)	Tolerance ± 0.8 °C (1.44 °F)

Optional switching outputs

	1D1S	4S	6S
Plug (base)	1 x M12 – 4-pin	2 x M12 – 4-pin	1 x M12 – 8-pin
<b>Switching outputs</b>	IO-Link and 1 x freely programmable with level or temperature assignment options	4 x freely programmable with assignment options, e.g. 2 x level/ 2 x temperature*	6 x freely programmable with assignment options, e.g. 4 x level/ 2 x temperature*
Alarm memory	with 1 x assignable to alarm logbook	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

\*also programmable as frequency output

\*\*Output 1 max. 0.2 A.

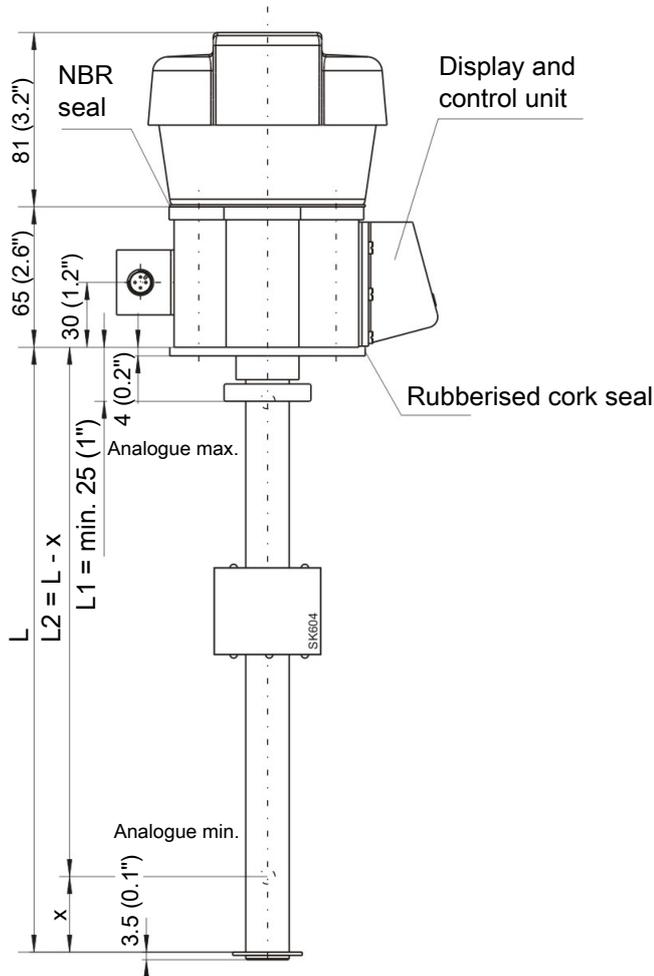
	2S-KN-KT	4S-KN-KT	6S-KN-KT
Plug (base)	2 x M12 – 4-pin	1 x M12 – 8-pin	2 x M12 – 4-pin / 8-pin
<b>Switching outputs</b>	2 x freely programmable with level or temperature assignment options	4 x freely programmable with level or temperature assignment options	6 x freely programmable with level or temperature assignment options
Alarm memory	with 1 x assignable to alarm logbook	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
<b>Analogue outputs</b>	1x level 1x temperature	1x level 1x temperature	1x level 1x temperature
Programmable as	4 – 20 mA, 2 - 10 V, 0 - 10 V, 0 - 5 V	4 – 20 mA, 2 - 10 V, 0 - 10 V, 0 - 5 V	4 – 20 mA, 2 - 10 V, 0 - 10 V, 0 - 5 V
Max. burden $\Omega$ as current output	$(U_B - 8 V) / 0.02 A$	$(U_B - 8 V) / 0.02 A$	$(U_B - 8 V) / 0.02 A$
Min. input load as voltage output	10 k $\Omega$	10 k $\Omega$	10 k $\Omega$

\*\*Output 1 max. 0.2 A.

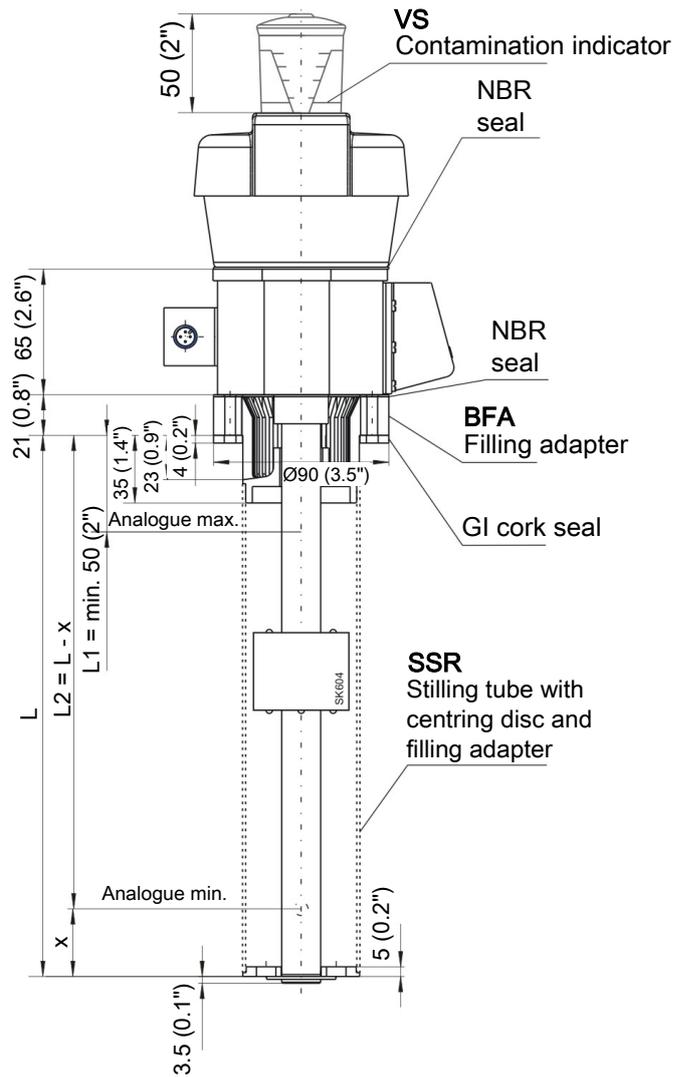
Other output cards available upon request.

Dimensions NV 77-XP

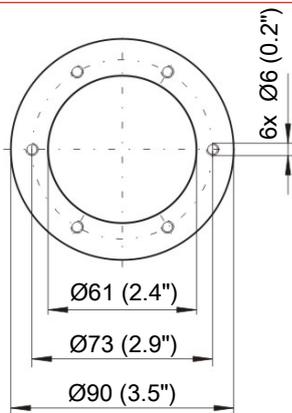
Basic version



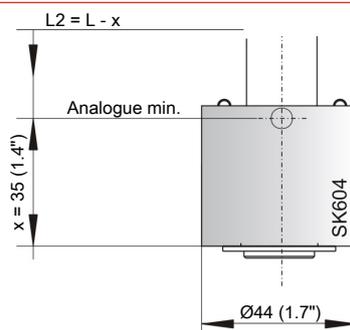
With options



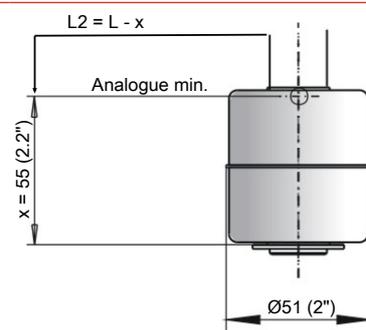
Flange drawing



SK 604 float for  
NV 77-XP-MS



SK 221 float for  
NV 77-XP-VA



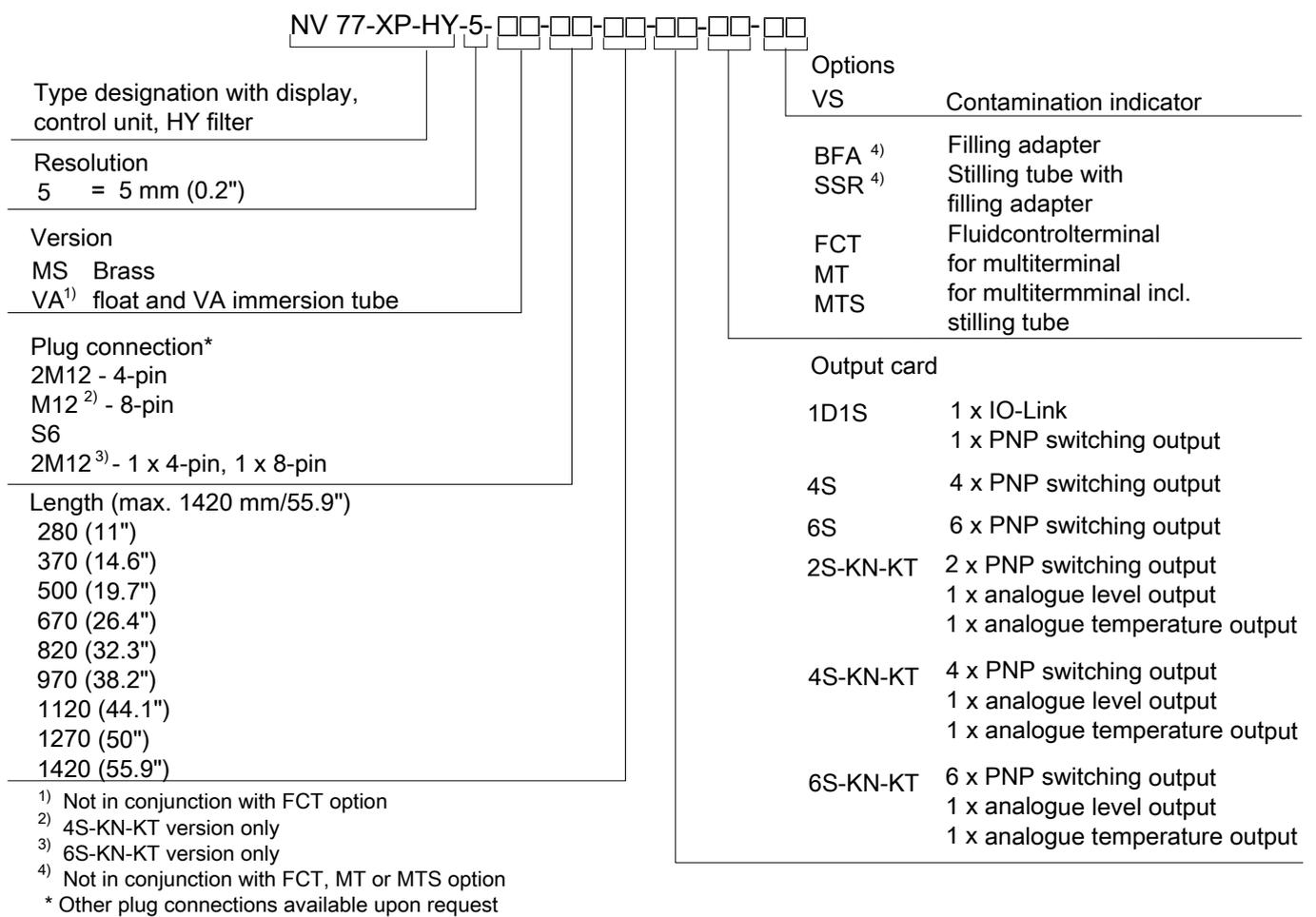
Ordering Instructions NV 77-XP

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



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: Level and temperature measurement with 5 mm (0.2") resolution, MS version, 2xM12 connector, L=670 mm (26.4"), clogging indicator, display and control unit with 2 PNP switching points and analogue output for level and temperature.

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Order: NV 77-XP-HY-5-MS-2M12 / 670-2S-KN-KT-VS

Standard pin assignment NV 77-XP

Plug connection

	S6	M12 (EBS)	2 x M12 (EBS) (galvanically isolated)
Dimensions			
Number of pins	6 pin + PE	8 pin	4 pin / 4 pin 4 pin / 8 pin
DIN EN	175201-804	61076-2-101	61076-2-101
Voltage max.	30 V AC / V DC	30 V DC	30 V DC
Contact load max.	0,5 A per output	0,5 A per output	0,5 A per output
total max.	1 A	1 A	1 A
Cable fitting	M20x1,5		

Version	1D1S	4S		6S	2S-KN-KT		4S-KN-KT	6S-KN-KT	
Plug	M12 4-pin	2x M12 4-pin		M12 8-pin	2xM12 4-pin		M12 8-pin	2x M12 4-pin/8-pin	
Connection schematic		Plug A 	Plug B 		Plug A 	Plug B 		Plug A 	Plug B 
Pin		Display			Display			Display	
1	+24 V DC	+24 V DC*	+24 V DC*	+24 V DC	+24 V DC*	+24 V DC*	+24 V DC	+24 V DC	+24 V DC
2	S2 (PNP)	S2 (PNP)	S4 (PNP)	S2 (PNP)	Temp (analog)	S2 (PNP)	S2 (PNP)	Temp (analog)	S2 (PNP)
3	GND	GND	GND	GND	GND	GND	GND	GND	GND
4	C/Q (IO-Link)	S1 (PNP)	S3 (PNP)	S1 (PNP)	Level (analog)	S1 (PNP)	S1 (PNP)	Level (analog)	S1 (PNP)
5				S3 (PNP)			S3 (PNP)		S3 (PNP)
6				S4 (PNP)			S4 (PNP)		S4 (PNP)
7				S5 (PNP)			Level (analog)		S5 (PNP)
8				S6 (PNP)			Temp (analog)		S6 (PNP)

\*Plugs A & B must be connected to ensure proper function! It is important to note here that the plug for the display should be connected last, otherwise an error will occur (error 1024).

Plug	S6	S6
Anschlussbild		
<b>Pin</b>		
1	+24 V DC	+24 V DC
2	GND	GND
3	S1 (PNP)	Level (analog)
4	S2 (PNP)	Temp (analog)
5	S3 (PNP)	S1 (PNP)
6	S4 (PNP)	S2 (PNP)