Ultrapure Gas Version

Overview VCR connections for pressure gauges with NCS 40, 50, 63

ARMANO

T01-000-033

In recent decades, as semiconductor technology has become more sophisticated, the variety of technical special gases and their purity requirements have also increased.
Other industries, such as analytical laboratories (ECD[1]), environmental technology and communications technology also increasingly require ultra-pure gases of the highest quality to achieve new goals. Typical applications include gas chromatography, spectroscopy, fuel cell development and glass fibre production. The maximum permissible degrees of contamination of the technical gas with impurities currently range from a few 100 ppm down to less than 10 ppb.

Technical gas (VDMA 4390-2)	Purity (%)	Max. permissible residual hydrocarbon content (mg/dm^2)	Tightness requirement max. permissible leakage rate (mbar · l/s)
technical standard gas (<4.5)	< 99.995	0.2 – 0.4	$\leq 10^{-4}$
clean gas (4.5...5.0)	99.995...99.999	≤ 0.2	$\leq 10^{-5}$
pure gas (> 5.0...6.0; ECD(1): >5.5)	99.999...99.9999	≤ 0.1	$\leq 10^{-8}$
ultra-pure gas (> 6.0; UHP[2])	> 99.9999	< 0.1	$\leq 10^{-9}$

To guarantee such high purity, also the piping system, the fittings and the connections have to meet the new requirements. Mainly austenitic stainless steel or, in the case of corrosive gases, resistant special materials such as Hastelloy are used. The connections in high-purity gas lines are typically made with orbital welding or VCR fittings.

Tube Ø	Max. permissible operating pressure (acc. to ASME B31.1; S=4)	
⅛"	590 bar	8550 psi
¼"	359 bar	5200 psi
⅜"	231 bar	3350 psi
½"	259 bar	3750 psi

ARMANO components for gas supply systems in ECD[1] or UHP[2] quality are essentially characterised by the following features based on the respective standards:

Corrosion resistant material
- austenitic stainless steel 316L

Ensuring gas tightness
- 100 % helium leak detection for leakage rate ≤ 10^{-9} mbar · l/s
- polished sealing surfaces with R_z < 1 µm

Purity
- electrochemically polished surfaces R_a < 0.4 µm (wetted inner surfaces)
- weldings with root protection (purge gas)
- free of grease and oil, cleaned
- vacuum-packed
- design free of dead spaces

ARMANO pressure gauges available for pure gases
- RChg 40 – 3v, RChg 40 – 3vrm (data sheet 1221)
  safety category acc. to DIN EN 837-1: S2
- RChg 50 – 3v, RChg 50 – 3vrm (data sheet 1231)
  safety category acc. to DIN EN 837-1: S2
- RCh 63 – 3, RCh 63 – 3r, RCh 63 – 3rm (data sheet 1211)
  safety category acc. to DIN EN 837-1: S2
- RCh 63 – 3v, RCh 63 – 3vr, RCh 63 – 3vrm (data sheet 1211)
  safety category acc. to DIN EN 837-1: S2
- RSCh 63 – 3, RSCh 63 – 3r (data sheet 1610)
  safety category acc. to DIN EN 837-1: S3

Optional
- NCS 63 (2½") also available with limit switch contact assembly[3]

[1] ECD – Electron Capture Detector (ECD) is a device for the gas chromatography
[2] UHP – Ultra High Purity (see table): maximum requirements for the semiconductor industry
[3] not depicted in the dimensional drawings

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PW/Wo/SWü

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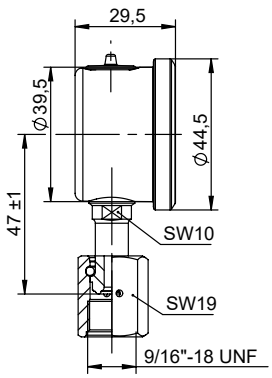
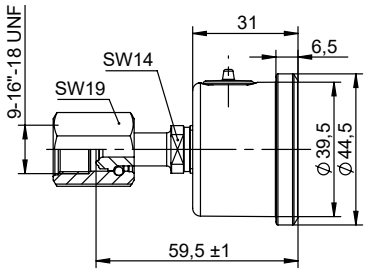
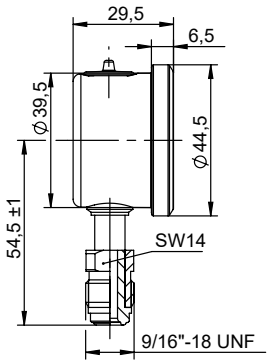
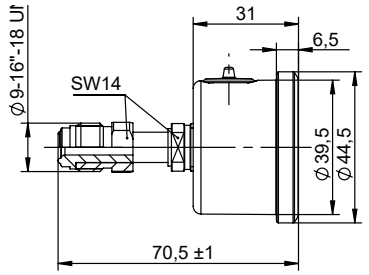
NCS 40 Crimped-on ring	Bottom connection	Centre back connection
VCR-F		
VCR-M		

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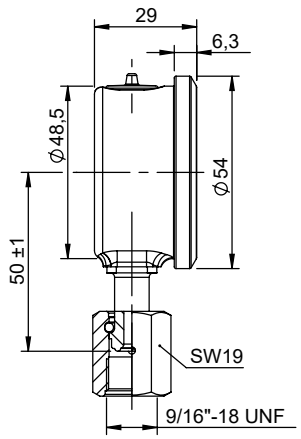
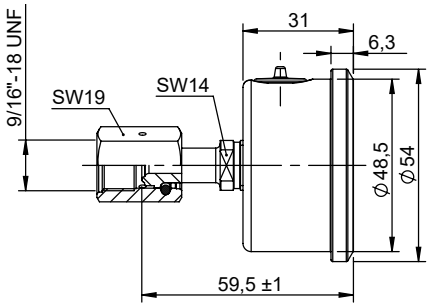
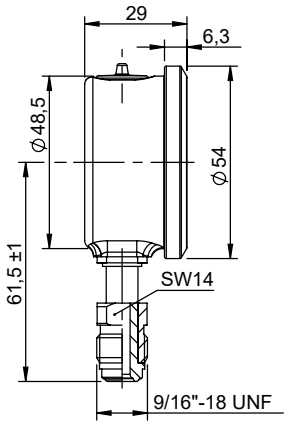
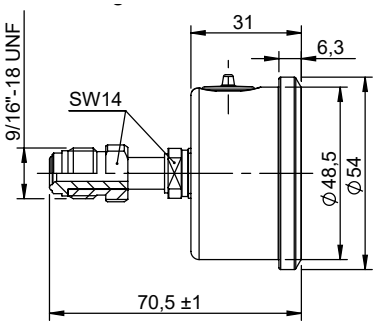
Overview VCR connections for pressure gauges with NCS 40, 50, 63

NCS 50 Crimped-on ring	Bottom connection	Centre back connection
VCR-F		
VCR-M		

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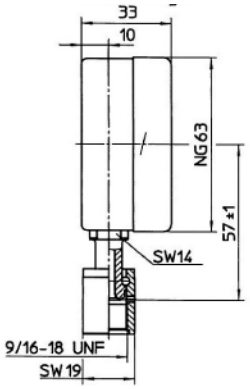
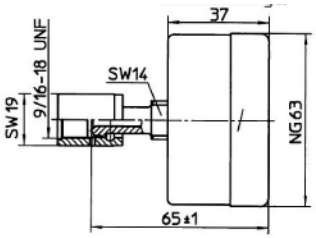
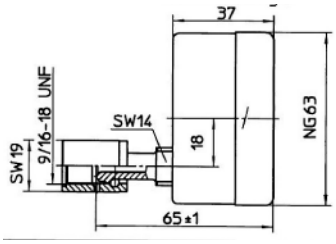
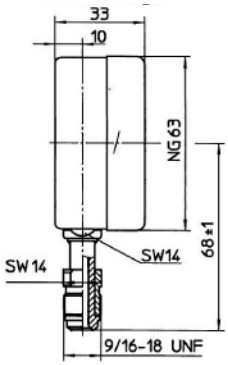
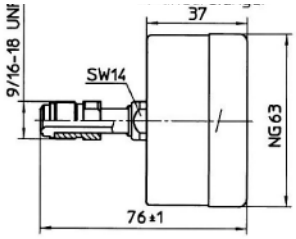
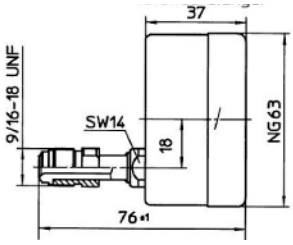
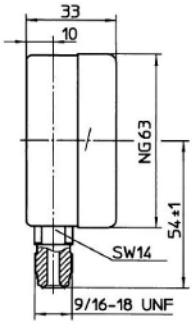
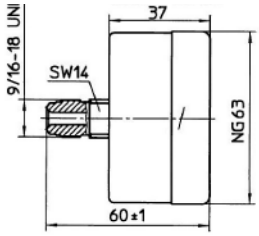
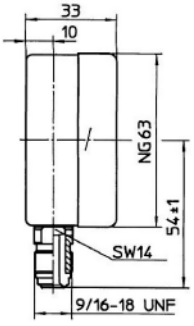
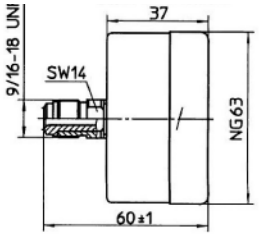
Overview VCR connections for pressure gauges with NCS 40, 50, 63

NCS 63 Bayonet ring	Bottom connection	Centre back connection	Lower back connection
VCR-F			
VCR-M			
VCR-M short rigid			
VCR-M short rotatable			

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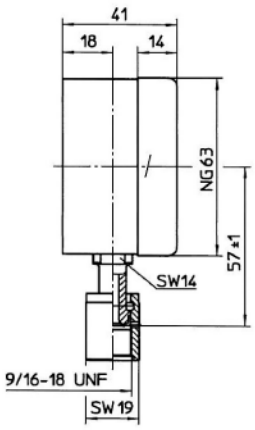
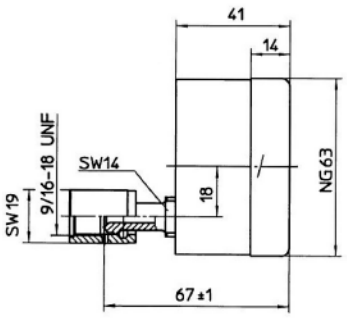
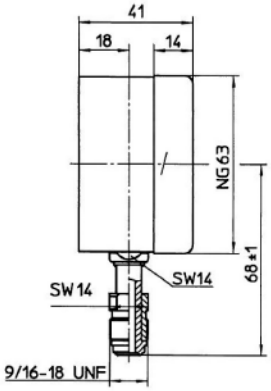
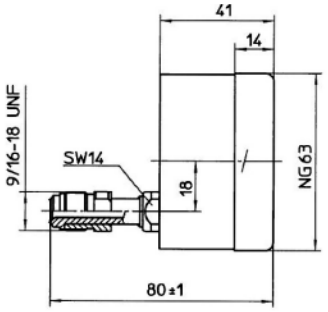
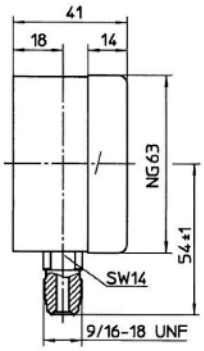
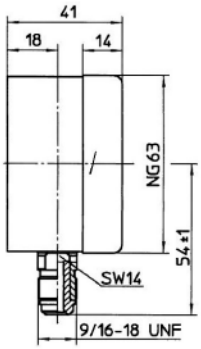
NCS 63 Bayonet ring	Bottom connection	Lower back connection
Ⓢ VCR-F		
Ⓢ VCR-M		
Ⓢ VCR-M short rigid		
Ⓢ VCR-M short rotatable		

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