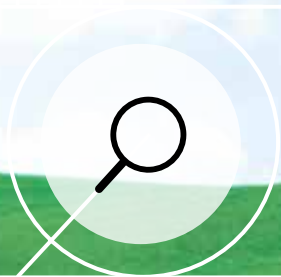


Customer Value through Innovation



# ***Quick Connectors***

*Innovative, secure and “quick fit”  
plug-in connectors*



Every day we strive to provide our customers with value through innovative cost-effective solutions to help them achieve their challenges.

NORMA Group's Quick Connector range offers state-of-the-art connection, **reducing permeation rates** and helping **reduce total system weight**. Made from synthetic material, our connectors are suitable for most media carrying lines.

# Quick Connector Range

## VDA Quick Connectors

### PS3

PS3 "Push & Seal" plastic quick connectors are an ideal means for the secure connection of cooling water and heating hoses as well as charged air systems.



4

### C Style

Specialized plastic quick connectors developed for coolant applications.



8

## SAE Quick Connectors

### S

S plastic connectors are designed to connect media carrying lines on automobiles and have been developed for fuel system applications. The connectors can be used for both line-to-line and line-to-device connections.



9

### SAE Style

Specialized plastic quick connectors developed for coolant applications.



12

## Quick Connectors

### V2

V2 plastic quick connectors are an ideal means to connect media carrying lines as well as ventilation and exhaust lines in combustion engines. The connectors can be used for both line-to-line and line-to-device connections.



13

### V3

The V3 is designed for coolant vent line. To ensure that you save space, the V3 only has a half locking ring and is designed with an anti-rotation feature.



17

### MK

MK Connectors have been developed to reduce permeation rates. Compared with standard connectors that are prone to high permeation rates and constant micro leakage, MK provides the perfect link between the tank and the pipe system.



20

### TWIST II

The TWIST II was brought to the market to connect plastic air intake or cooling system pipes in order to get leak-proof connections.



22

### TWIST III

TWIST III is a quick connector series for charged air system applications.



24

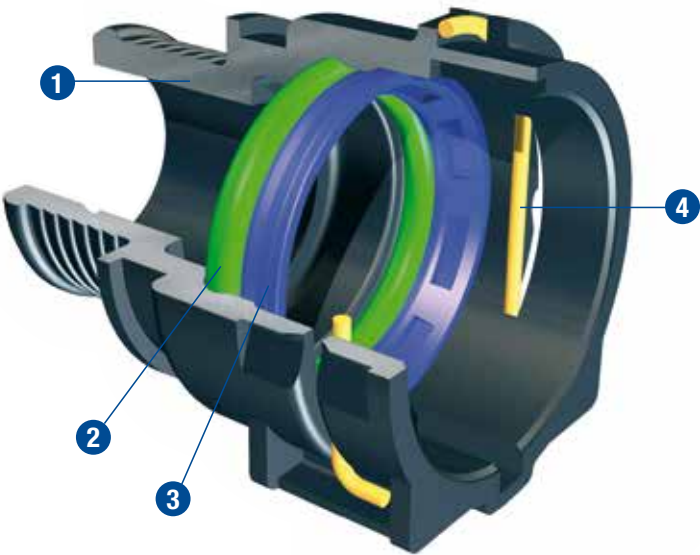
## VDA QUICK CONNECTORS

### PS3 – QUICK CONNECTORS

PS3 “Push & Seal” plastic quick connectors are an ideal means for the secure connection of coolant and heater hoses as well as charged air systems.

### The advantages at a glance

- Time and cost reduction
- Automated processes
- To be used in extremely narrow spaces
- Optimal tightness
- Locator/anti rotation tab feature



- 1 Housing
- 2 O-ring
- 3 Retaining ring
- 4 Retainer (spring)

#### Applications

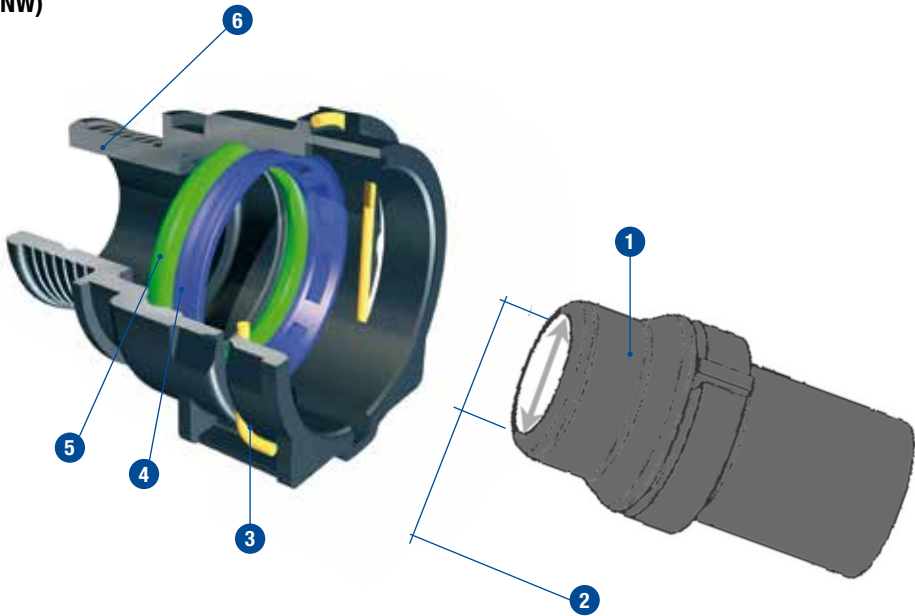
- Cooling water lines
- Heating lines
- Charged air connections

### PS3

#### VDA-Connecting spigot

Please note that all PS3 connectors are delivered without spigot. We will be pleased to offer suitable spigots on request.

- 1 Connection spigot
- 2 Diameter of bore = Nominal Width (NW)
- 3 Retainer (spring)
- 4 Retaining ring
- 5 O-ring
- 6 Connector



#### Standard materials

PS3 quick connectors are made from recyclable materials. For our standard versions we use Polyamide 6.6 with 30% glass fiber content.

The standard material for the O-rings consists of peroxide-cured EPDM which is resistant to coolant. For PS3 connectors that are likely to be used in direct contact with coolants we recommend standard PA 6.6 with 30% glass fiber material which is compounded for heat and hydrolysis.

In case of special applications (e.g. charged air ducts) PS3 connectors can be made from other technical thermoplastic materials with different filler types and contents. Please note, however that special types can only be made when the required minimum quantity is ordered.



VDA QUICK CONNECTORS

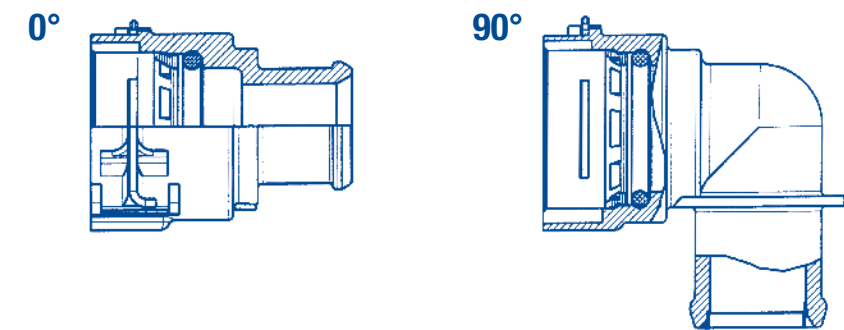
PS3

Technical features

Medium/Fluid	Operating Pressure	Operating Temperature
Coolant	Minimum required approx. 1.5 bar excess pressure. Can be tested for each application separately.	Engine compartment: –40°C to +135°C Short time up to +150°C (approx. 30 min.)

Summary of sizes

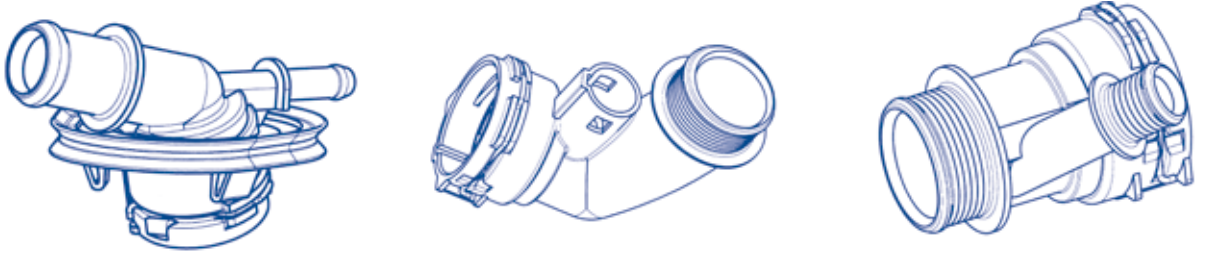
Two types of PS3 (0° and 90°) are available as standard versions.



Nominal diameters in mm (inside diameter of the bore)	0°	90°
8	X	X
12	X	X
16	X	X
20	X	X
26	X	–
32	X	X
40	X	–
50	X	–

PS3

Examples



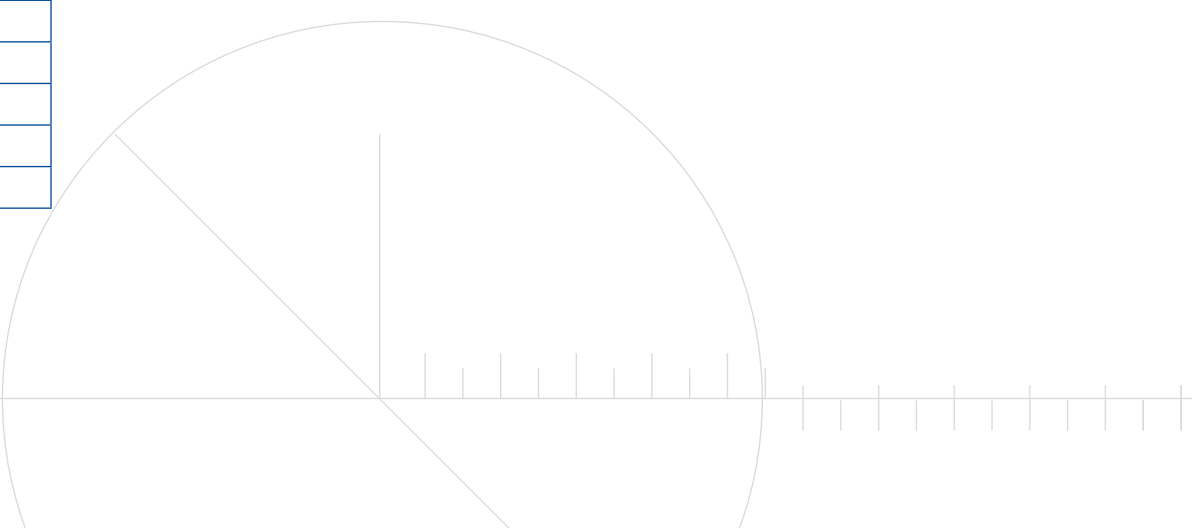
PS3 with integrated junction piece, seal and branch      Flow-optimized PS3 with integrated receptacle for thermo sensor      PS3 with integrated junction piece

Enquiries/ordering

When making enquiries or placing orders please state as follows:

	1. Type	2. Nominal width	3. Variant
Example	PS3	16	0°

During the last couple of years we have built up a selection of special/customized connector types. The geometries can be substantially modified to customer requirements and it is possible to integrate additional functional elements, e. g. thermo sensors. We would be pleased to answer your questions.



## VDA QUICK CONNECTORS

### C STYLE

Specialized plastic quick connectors developed for coolant applications. Test parameters are significant higher than operation parameters. Special applications possible, contact us!



### The advantages at a glance

- Media: Coolant
- Operating temperature:  $-40\text{ }^{\circ}\text{C}$  to  $135\text{ }^{\circ}\text{C}$ , short term higher
  - Pressures: 0 to 2 bar pos. pressure, partially pulsating (sinusoidal)
  - Vibrations: Usually engine vibrations 7–200 Hz, 0,2–20 g

- 1 Housing
- 2 O-ring
- 3 Retaining ring
- 4 Retainer (spring)
- 5 Diameter of bore = Nominal Width (NW)
- 6 Connector

Please check page 5 for exploded view.

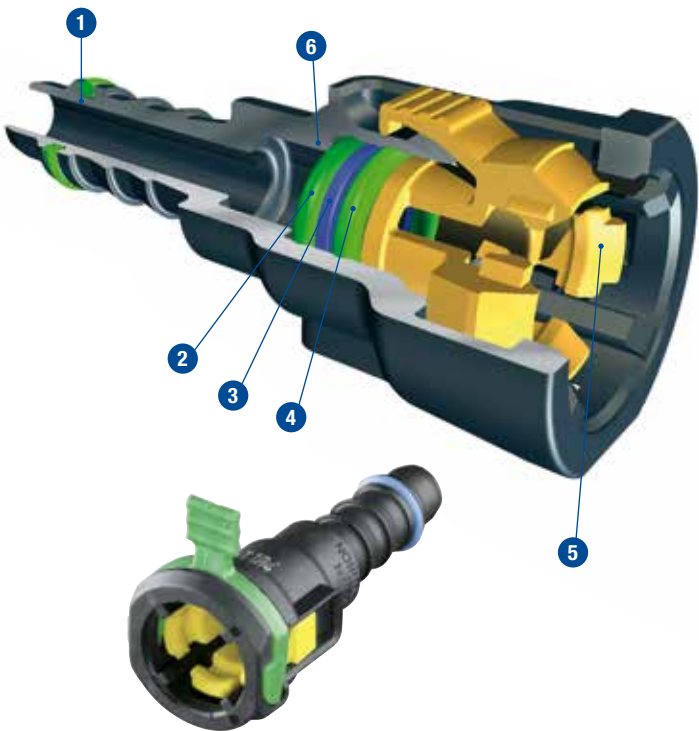
#### Applications

Coolant, glycol and water applications.

## SAE QUICK CONNECTORS

### S – SAE J2044 QUICK CONNECTORS

S plastic quick connectors are designed to connect media carrying lines on automobiles and have been developed for fuel system applications. The product is characterized by its “click” sound as well as its quick and safe connection.



### The advantages at a glance

- Fast assembly without tool
- Robot assembly possible
- Compact building method
- Integrated seal
- Closing cone principle

- 1 Firtree plus O-ring (optional)
- 2 Primary O-ring
- 3 Spacer
- 4 Secondary O-ring
- 5 Retainer (spring)
- 6 Housing

#### Applications

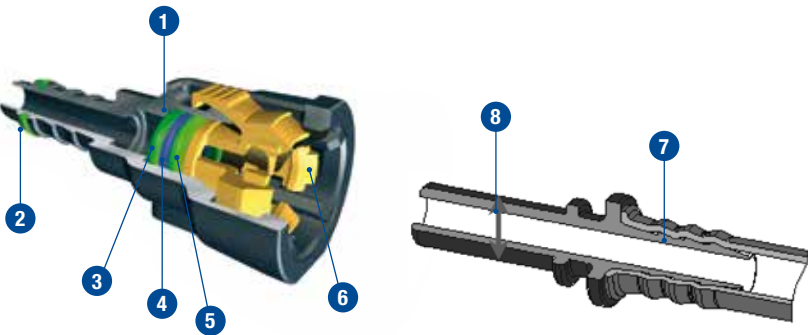
- Fuel lines
  - Feed and return lines
  - Tank breathing
- Ventilation lines
- Oil cooler lines
- Vacuum control lines

SAE QUICK CONNECTORS

S

Connecting spigot

To NORMA Group's standard (Production drawings will be made available on request) S connectors can be used on both plastic and metal spigots. Would you please note that all S connectors are delivered without spigot. However, we will be pleased to offer suitable spigots on request.



- 1 Housing
- 2 Firtree plus O-ring (optional)
- 3 Primary O-ring
- 4 Spacer
- 5 Secondary O-ring
- 6 Retainer (spring)
- 7 Adapter
- 8 Diameter of Connecting spigot = Nominal Width (NW)

Standard materials

S connectors are made from recyclable materials featuring extremely low permeation values. Our standard versions are made from Polyamide 6 or Polyamide 12 with 20–50% glass fiber content. The O-rings are made of FPM and FVMQ as standard equipment.

Insiders' Tip

The perfectly matched system is achieved when combining S quick connectors and our fluid systems.

Technical features

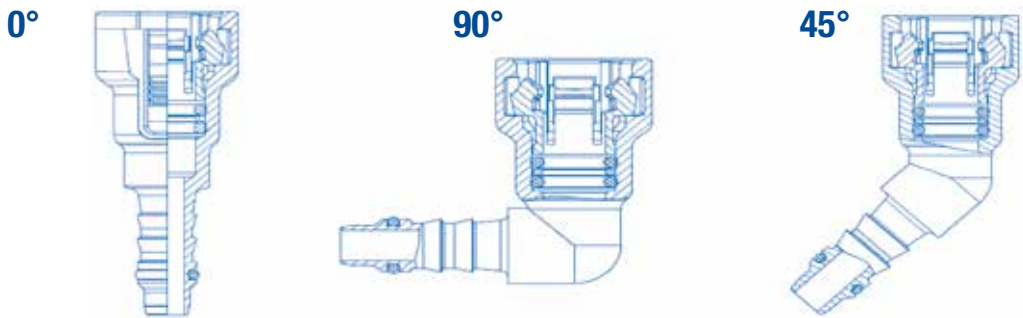
Medium/Fluid	Operating Pressure	Operating Temperature
Fuel	Approx. 10 bar excess pressure	Engine compartment: –40°C up to +135°C Short time up to +150°C (approx. 30 min.)

Meeting the requirements of SAE J2044

S

Summary of sizes

Types of S (0° and 90°) are available as standard versions (special versions like 45° or others upon request).



Nominal size	Outside diameter spigot (o-ring sealing diameter of spigot)	Version 0°	Version 90°	Version 45°
1/4"	6,3 mm	X	X	–
5/16"	7,89 mm	X	X	X
8 mm	8,00 mm	X	X	–
3/8"	9,49 mm	X	X	X
10 mm	9,89 mm	X	X	X
1/2"	12,61 mm	X	X	X
14 mm	14,24 mm	X	X	X
5/8"	15,82 mm	X	X	X

Materials

S connectors are made from recyclable materials featuring extremely low permeation values. Our standard versions are made from Polyamide 6 or Polyamide 12 with 20–50% glass fiber content. The o-rings are made of >FPM< and >FVMQ< as standard equipment. All our available nominal sizes are validated according SAEJ2044.

Enquiries/ordering

When making enquiries or placing orders please state as follows:

		Example
1.	Quickconnector Type	NQS
2.	"Nominal size (o-ring sealing diameter of spigot)"	"5/16" "(7,89 mm)"
3.	Version 0°, 45° or 90°	0°
4.	Application	Fuel
5.	"Inner diameter assembled PA-tube or hose"	PA-tube ID=06mm
6.	OEM / end customer	tbd
7.	Annual volume	100.000 pieces / year
8.	SOP	CW 34/2014

## SAE QUICK CONNECTORS

### SAE STYLE

Specialized plastic quick connectors developed for coolant applications.  
Test parameters are significant higher than operation parameters.  
Special applications possible, contact us!



### The advantages at a glance

Media: Coolant  
Operating temperature: –40 °C to 135 °C, short term higher  
Pressures: 0 to 2 bar pos. pressure, partially pulsating (sinusoidal)  
Vibrations: Usually engine vibrations 7–200 Hz, 0,2–20 g

- 1 Firtree or hose barb option
- 2 Primary O-ring
- 3 Spacer
- 4 Secondary O-ring
- 5 Retainer (spring)
- 6 Housing

Please check page 10 for exploded view.

#### Applications

Coolant, glycol and water applications.

## QUICK CONNECTORS

### V2 – QUICK CONNECTORS

V2 plastic quick connectors are an ideal means to connect media carrying lines as well as ventilation and exhaust lines in the automotive industry.



### The advantages at a glance

Fast assembly without tool  
Robot assembly possible  
Compact dimensions  
Integrated seal  
The seals can be visually checked

- 1 Firtree plus O-ring (optional)
- 2 Secondary O-ring
- 3 Primary O-ring
- 4 Locking device (ring)
- 5 Housing

#### Applications

- Fuel lines
  - Tank breathing
- Ventilation and exhaust lines
  - Secondary air lines
  - Crank case ventilation lines
- Oil cooler lines
- Vacuum brake line

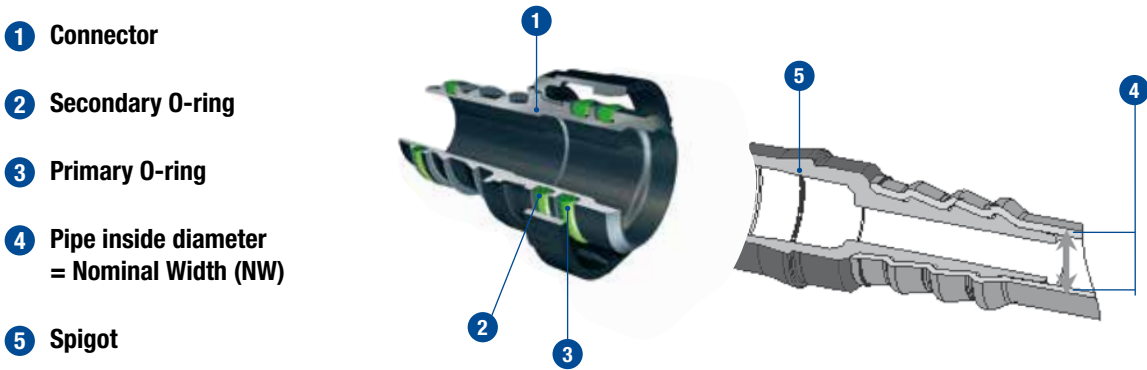


QUICK CONNECTORS

V2

Connecting Spigot

To NORMA Group's standard (Production drawings will be made available on request)  
V2 connectors can be used on both plastic and metal spigots. Please note that all V2 connectors are delivered without spigot. However, we will be pleased to offer suitable spigots on request.



Standard materials

V2 connectors are made from recyclable materials featuring extremely low permeation values. Our standard versions are made from Polyamide 6 with 30% glass fiber content or Polyamide 12 with 20% glass fiber content. The O-rings are made of NBR, HNBR, FPM and FVMQ as standard equipment.

Insiders' Tip

The perfectly matched system is achieved when combining V2 quick connectors and our fluid systems.



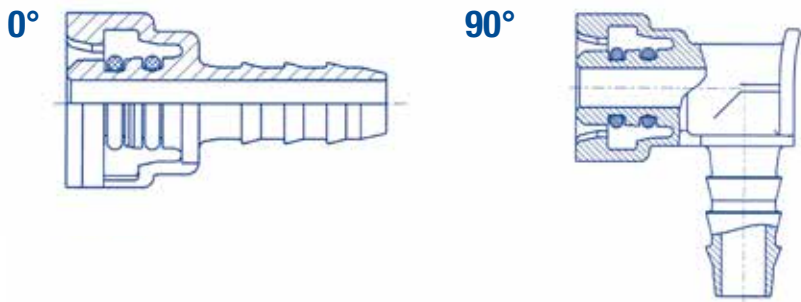
Technical features

Medium/Fluid	Operating Pressure	Operating Temperature
Fuels, air, oil & oil vapours	Approx. 5 bar excess pressure	Engine compartment: -40°C up to +135°C Short time up to +150°C (approx. 30 min.)

V2

Summary of sizes

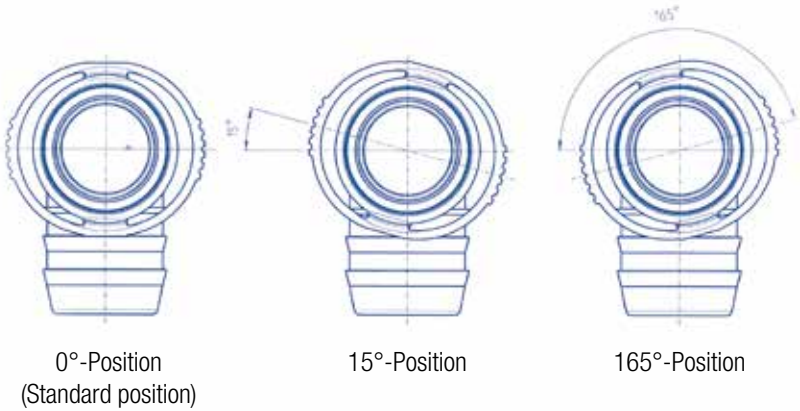
Two types of V2 connectors (0° and 90°) are available as standard versions.



Nominal width (mm) (inside diameter of the PA pipe to be connected)	0°	90°
4	X	X
6	X	X
7	X	X
8	X	X
10	X	X
12	X	X
15	X	X
19	X	X
25	X	–
27	X	X
33	X	–

Examples

The drawings show the principle as exemplified by the V2 NW 19, 90° quick connector:



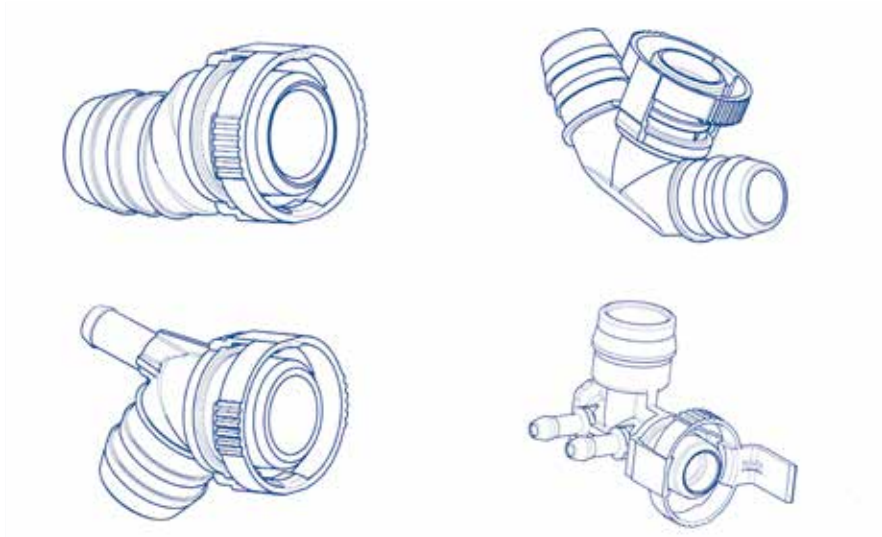


QUICK CONNECTORS

V2

Examples

During the last couple of years we have built up a selection of approx. 200 special/customized connector types. We will be pleased to inform you in more detail on request.



Enquiries/ordering

When making enquiries or placing orders please state as follows:

	1. Type	2. Nominal width	3. Variant
Example	V2	15	0°

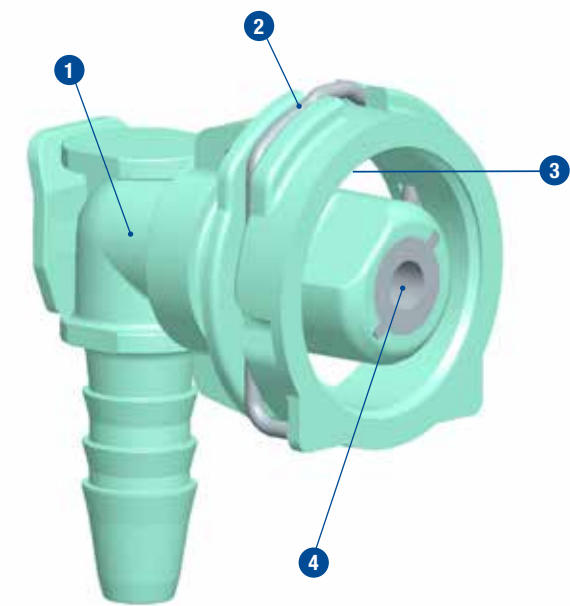
Special installation dimensions may require the dismantling ring to be oriented at an angle which deviates from that of the standard version. For such cases we supply quick connectors with dismantling rings oriented at the following angles:

V2-NW 19 with dismantling ring oriented at an angle of 15°, 30°, 45° etc. in steps of 15°

V2-NW 27 with dismantling ring oriented at an angle of 10°, 20°, 30° etc. in steps of 10°

V3

The V3 is designed for coolant vent lines. To guarantee that the product can resist cooling-water, the V3 is made two-parted. The housing is made of materials resistant to cooling-water and the locking ring is made of flexible material.



The advantages at a glance

- Simple design
- Cost effective and reliable
- No assembly or disassembly tool required
- Anti-rotation feature.

- 1 Housing
- 2 Plastic or metal locking-ring/retainer
- 3 O-ring (hidden in image)
- 4 V3 with integrated check-valve

Applications

- Coolant vent lines

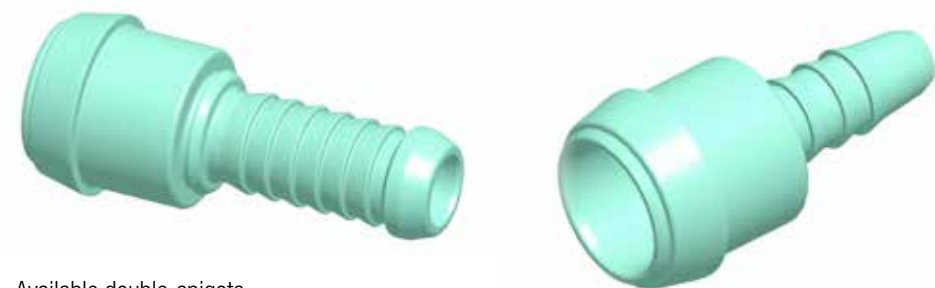


QUICK CONNECTORS

V3

Connecting spigot

To NORMA Group's standard (production drawings will be made available on request)  
V3 connectors can be used on both plastic and metal spigots. Please note that all V3 connectors are delivered without spigot. However, we will be pleased to offer suitable spigots on request.



Available double-spigots.  
V3 size 6-9,4-0° for rubber-hose and PA tubes.

Standard materials

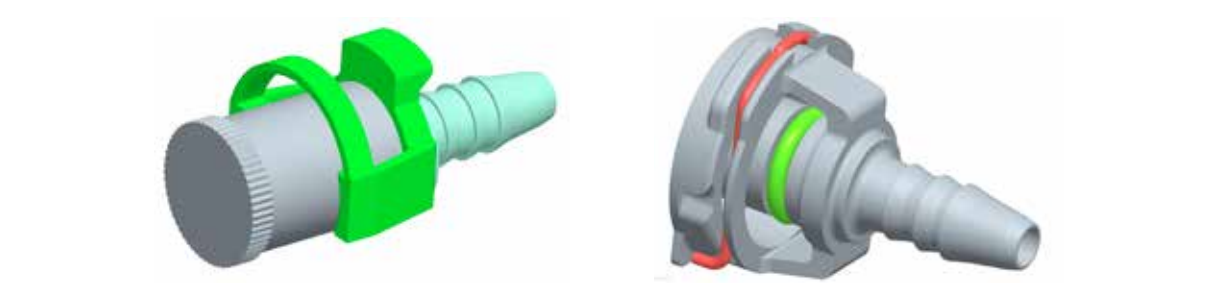
Housing	PA66-GF35
Locking-ring	PA6-GF50
O-Ring	EPDM
Retainer/Locking-ring	stainless steel

V3

Examples



V3 size 06 with vent-cap      V3 size 06 blind plug      V3 NW 6-9,4-0° for rubber hose crimped alu-sleeve



Dust cap for coupling-head V3 size 6 available standardly Suitable at all coupling heads V3 NW 6 (with plastic locking ring and metal spring)      V3 size 6 with check-valve (Available without check-valve) (plastic ball)

QUICK CONNECTORS

MK

MK connectors have primarily been developed to reduce permeation rates. Compared with standard connectors that are prone to high permeation rates and constant micro leakage, MK provides the perfect link between the tank and the pipe system. The MK is not a standard part. All projects are based on specific customer requirements. We are therefore pleased to receive a description of your application in order to offer you an optimal, customized solution.



The advantages at a glance

- Competitive price
- Can offer the complete solution and knowledge
- Full in-house production – we produce the entire system on our own from connectors to fuel lines to multi-layer lines
- Easy assembly
- Low permeation rate
- LET tube key component meets high requirement for a competitive price
- Reduces weight
- State-of-the-art lab to test products on request
- Conductive PA is possible

Easily combined with other NORMA Group's products such as:

- S
- PS3
- V2
- Fluid Systems

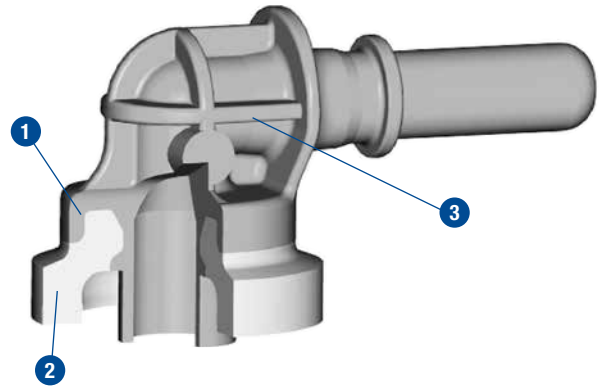
Technical features

- Angle versions: 0°, 90°
- Meeting the requirements of standards as ENG 016, VW TL 82417, KT-2KDL-0802, STD-SAL 0013

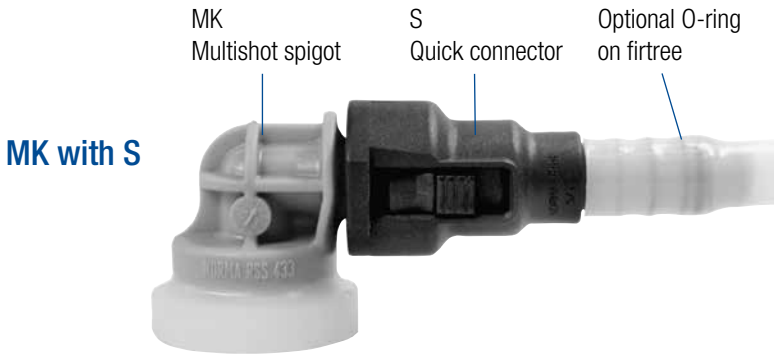
MK

Connecting spigot

MK connectors have been developed with the aim to achieve significantly reduced permeation rates. MK provide a perfect link between the tank and the pipe system in cases where existing standard 1K connectors are prone to a high permeation rate while their tendency to “creep” causes additional micro leakage. MK for the first time combine reinforced and unreinforced materials and thus enable the safe connection of the connector with the plastic fuel tank.



- 1 Chemical bonding
- 2 Welded ring HDPE
- 3 Spigot PA 12 (glass fiber reinforced)



Standard materials

MK combine materials that so far have been incompatible. Welded ring made from HDPE, can be welded onto the plastic fuel tank. Spigot made from Polyamide 12 with 30% glass fiber content.

Insiders' Tip

The perfectly matched system is achieved when combining MK connecting spigots and NORMA Group Fluid systems.

QUICK CONNECTORS

TWIST II – QUICK CONNECTORS

The TWIST II was brought to the market to connect plastic air intake or cooling system pipes in order to get leak-proof connections. By using the TWIST connector system, you can combine your design with plastic, aluminum or steel tubes. Flexibility and freedom of design are key words when systems with integrated TWIST connectors are engineered. TWIST connectors are engineered, eliminating leakages and helping reduce weight.



The advantages at a glance

- Can be integrated in end-tanks as well as be mounted on tubes or hoses
- A secure seal to the mating spigot with a low assembly force
- Robust and clear locking features with a click function to ensure a correct lock
- Easy operation for disassembly
- Temperature resistance of up to 180°

- 1 Housing
- 2 Sealing Component
- 3 Ring

Applications

Air intake, charge air and cooling water systems.

TWIST II

Variants

Since all our TWIST II are made of thermoplastic materials, we can adopt the connector features and customize our connectors to suit your demands.



TWIST II – 0°



TWIST II – 90°



TWIST II elbow – 90°



TWIST II – 0°

Materials

The components are combined in a way to match the specific requirements of each application and to provide the best possible physical and chemical properties. TWIST II is manufactured in recyclable materials with low permeation values. PA 66 with a glass fibre content of 30% is usually used for standard products. For coolant applications, we recommend the use of heat and hydrolysis stabilized glass fibre reinforced PA materials. Special applications, e.g. charge air systems with high temperatures require specific material grades. On request, we are ready to advise you on the best-suited material choice. O-rings are made of standard materials EPDM, NBR, FPM and FVMQ.

Standard materials

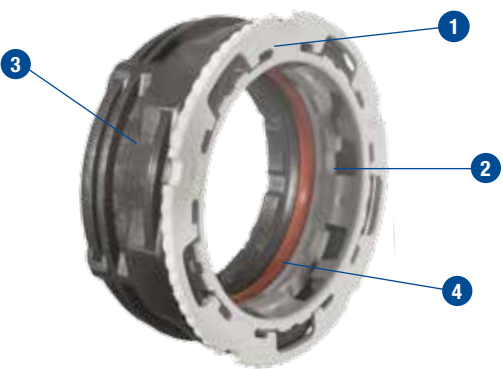
TWIST II quick connectors are made out of recyclable materials. As a standard solution Polyamide 6.6 with 30% to 50% glass fiber reinforcement is used. When an application requires, other engineering thermoplastic material can be used. Different reinforcement fillers and additional heat or hydrolysis resistance can also be added. Application based design is possible when a minimum required quantity is ordered.



QUICK CONNECTORS

TWIST III – QUICK CONNECTORS

TWIST III is a quick connector series for charged air system applications. Developed to meet extremely tough requirements, especially in low-emission vehicles, it combines a low assembly effort with very good hydrolysis tolerance, temperature resistance and mechanical performance. TWIST III operates at approx. 2.75 bar excess pressure and engine compartment temperatures of -48°C up to +135°C. Standard design configurations, 90° and adaptors. Special designs are also available.



Standard design



Optional design



Optional design – Customer specific with an air port and a sensor base.

The advantages at a glance

- Compact design – space savings
- Always in “closed” position
- Easy open – no tool needed

- 1 Spider Ring
- 2 Supporting Ring
- 3 Housing
- 4 Sealing component

Applications

Charge air applications - cold side

TWIST III

Examples



TWIST III V0 SP, welded on a blow molded pipe

Standard sizes and designs

TWIST III connector size designations are determined by the sealing diameter (ØD1) of the TWIST III spigot. Current standard diameters are listed below. Larger diameters may be added. Five standard sizes are available. TWIST III SP (spin-weld) is for applications where the quick connector will be spin-welded to other injection or blow-molded plastic components. Based on recommendations from a spin-welding equipment supplier, this design includes weld surfaces, flash traps and support surfaces. This connector is tested using the GMW 15803 specification as reference.

TWIST III Quick Connector	Ø D1 (mm)
TWIST III 48.40	48.40
TWIST III 56.40	56.40
TWIST III 67.40	67.40
TWIST III 71.40	71.40
TWIST III 80.00	80.00

## QUICK CONNECTORS

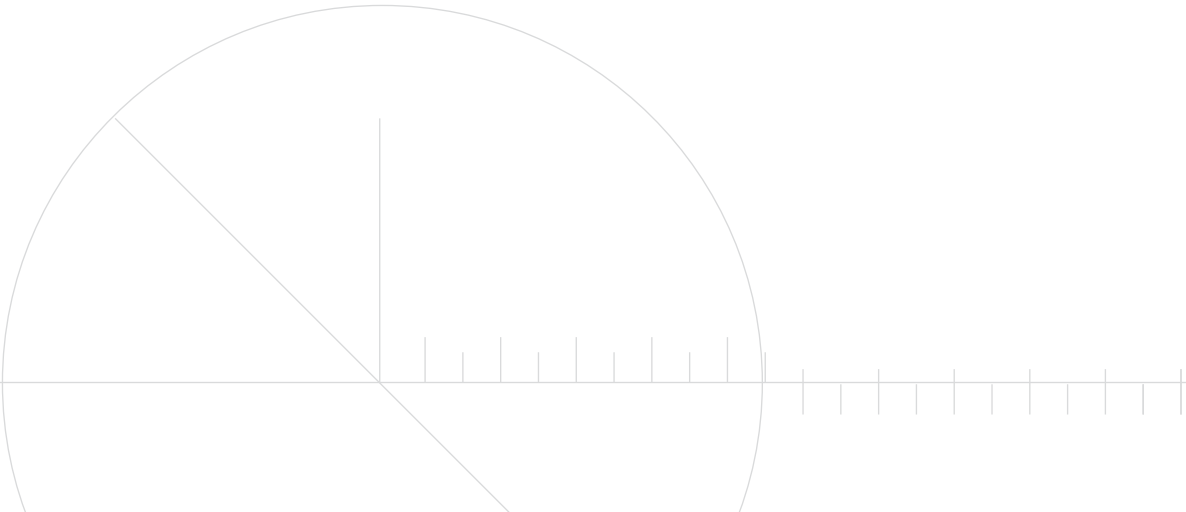
### TWIST III

#### Optional designs

TWIST III connector size designations are determined by the sealing diameter (ØD1) of the TWIST III spigot. Current standard diameters are listed below. Larger diameters may be added. Five standard sizes are available. TWIST III SP (spin-weld) is for applications where the quick connector will be spin-welded to other injection or blow-molded plastic components. Based on recommendations from a spin-welding equipment supplier, this design includes weld surfaces, flash traps and support surfaces. This connector is tested using the GMW 15803 specification as reference.

#### Materials and construction

Standard versions are made from recyclable polyamide 66 with 35% to 50% GF. O-rings are currently available in Silicone (for diesel fuel resistance) and AEM (for gasoline resistance). Note that both plastic and metal spigots can be used. TWIST III quick connectors have a 360° symmetrical design. As they can be opened from any angle, they are perfect for tight environments as well as spin-weld applications. Additional cut-outs or knobs are not necessary.



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