ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Pilz PNOZ 2VQ 24VDC 3N/O 1N/C 2N/O T* at our website: *Click HERE*

Category 4, EN 954-1
PNOZ 2VQ



Safety relay for monitoring E-STOP pushbuttons and safety gates.

Approvals

	PNOZ 2VQ
c UL us LISTED	◆
CCC	◆

Unit features

- Positive-guided relay outputs:
  - 3 safety contacts (N/O), instantaneous
  - 2 safety contacts (N/O), delay-on de-energisation
  - 1 auxiliary contact (N/C), instantaneous
- Connection options for:
  - E-STOP pushbutton
  - Safety gate limit switch
  - Reset button
- Delay-on de-energisation can be set separately for both safety contacts with delay-on de-energisation
- Delay time can be cancelled via reset button
- LED indicator for:
  - Switch status channel 1/2
  - Supply voltage

Unit description

The safety relay meets the requirements of EN 60947-5-1, EN 60204-1 and VDE 0113-1 and may be used in applications with

- E-STOP pushbuttons
- Safety gates

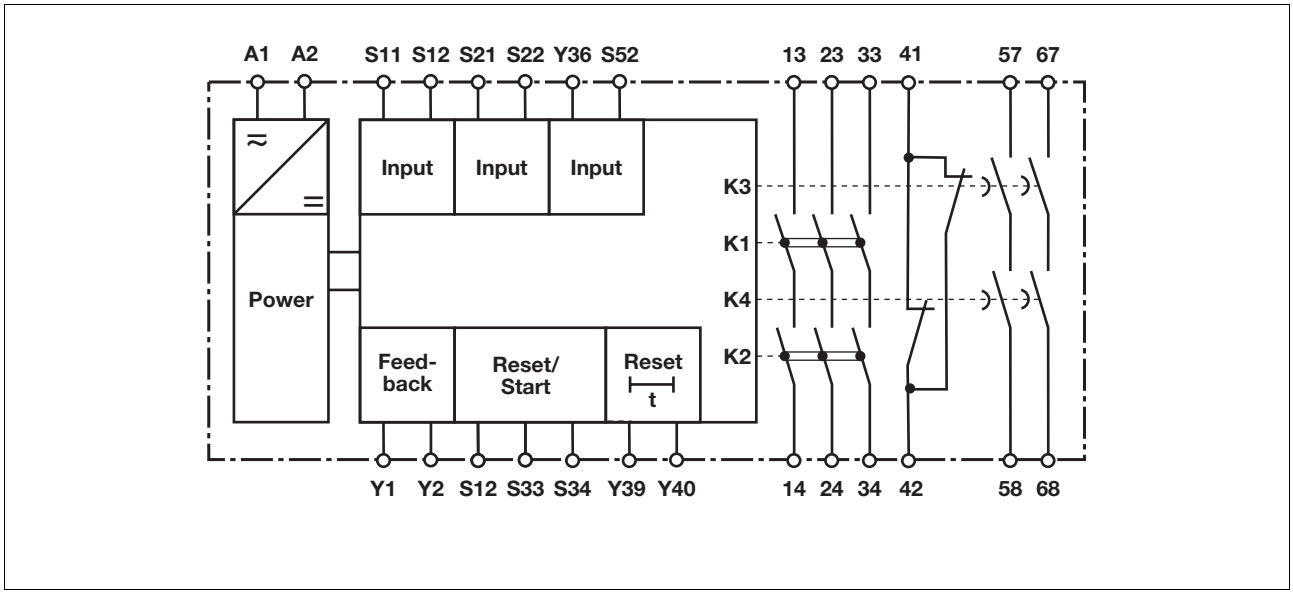
The max. category the safety contacts can achieve in accordance with EN 954-1 is stated in the technical details.

Safety features

The relay meets the following safety requirements:

- The circuit is redundant with built-in self-monitoring.
- The safety function remains effective in the case of a component failure.
- The correct opening and closing of the safety function relays is tested automatically in each on-off cycle.
- The unit has an electronic fuse.

Block diagram



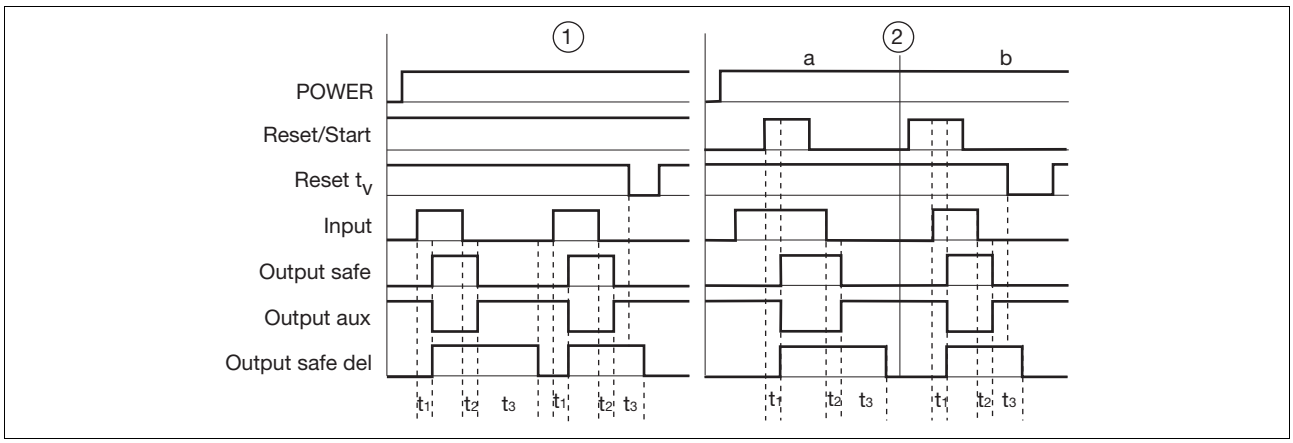
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Category 4, EN 954-1
PNOZ 2VQ

Function description

- Single-channel operation: no redundancy in the input circuit, earth faults in the reset and input circuit are detected.
- Dual-channel operation without detection of shorts across contacts: redundant input circuit, detects
  - earth faults in the reset and input circuit,
  - short circuits in the input circuit and, with a monitored reset, in the reset circuit too.
- Dual-channel operation with detection of shorts across contacts: redundant input circuit, detects
  - earth faults in the reset and input circuit,
  - short circuits and shorts between contacts in the input circuit.
- Automatic start: Unit is active once the input circuit has been closed.
- Manual reset: Unit is active once the input circuit is closed and then the reset circuit is closed.
- Increase in the number of available contacts by connecting contact expansion modules or external contactors/relays.

Timing diagram



Key

- Power: Supply voltage
- Reset/start: Reset circuit S12, S33, S34
- Reset t_v: Y39-Y40
- Input: Input circuits S11-S12, S21-S22, Y36-S52
- Output safe: Safety contacts 13-14, 23-24, 33-34
- Output safe del: Safety contacts, delayed 57-58, 67-68
- Output aux: Auxiliary contacts 41-42
- ①: Automatic reset
- ②: Manual reset
- a: Input circuit closes before reset circuit
- b: Reset circuit closes before input circuit
- t_1: Switch-on delay
- t_2: Delay-on de-energisation inst. contacts
- t_3: Delay time

Wiring

Please note:

- Information given in the “Technical details” must be followed.
- Outputs 13-14, 23-24, 33-34 are instantaneous safety contacts, outputs 57-58, 67-68 are delay-on de-energisation safety contacts, output 41-42 is an instantaneous auxiliary contact (e.g. for display).
- To prevent contact welding, a fuse should be connected before the output contacts (see technical details).
- Calculation of the max. cable runs I_{max} in the input circuit:

$$I_{max} = \frac{R_{lmax}}{R_l / km}$$

R_{lmax} = max. overall cable resistance (see technical details)
R_l /km = cable resistance/km

- Use copper wire that can withstand 60/75 °C.
- Sufficient fuse protection must be provided on all output contacts with capacitive and inductive loads.

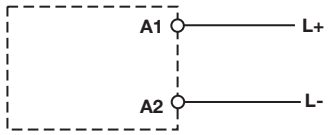
Pilz GmbH & Co. KG, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

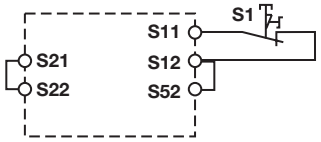
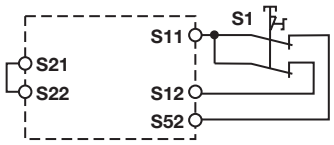
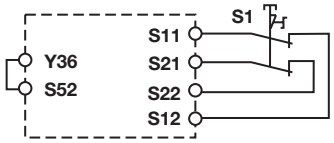
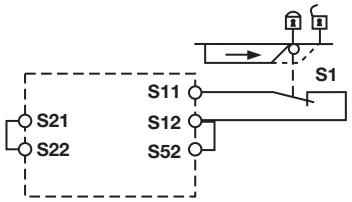
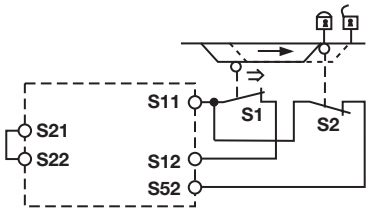
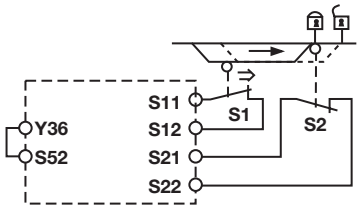
Category 4, EN 954-1
PNOZ 2VQ

Preparing for operation

▸ Supply voltage

Supply voltage	AC	DC
		

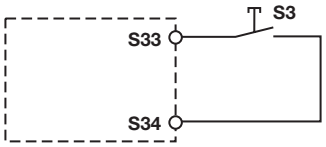
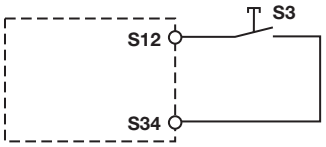
▸ Input circuit

Input circuit	Single-channel	Dual-channel
E-STOP **without** detection of shorts across contacts		
E-STOP **with** detection of shorts across contacts		
Safety gate **without** detection of shorts across contacts		
Safety gate **with** detection of shorts across contacts		

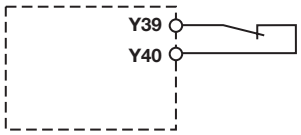
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Category 4, EN 954-1
PNOZ 2VQ

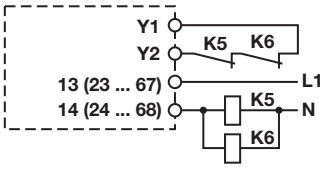
Reset circuit

Reset circuit	E-STOP/safety gate wiring (single-channel and dual-channel without shorts across contacts)	E-STOP/safety gate wiring (dual-channel with shorts across contacts)
Automatic reset		
Manual reset		

Reset delay time

Reset	Without reset	With reset
Link or N/C contact		

Feedback loop

Feedback loop	
Contacts from external contactors	

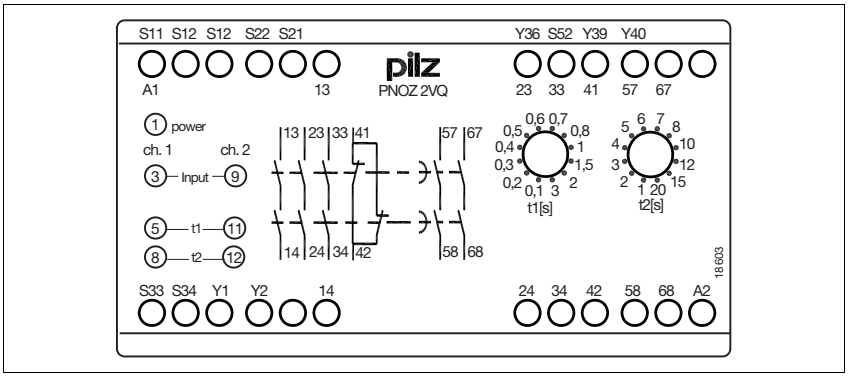
Key

S1/S2	E-STOP/safety gate switch
S3	Reset button
	Switch operated
	Gate open
	Gate closed

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Category 4, EN 954-1
PNOZ 2VQ

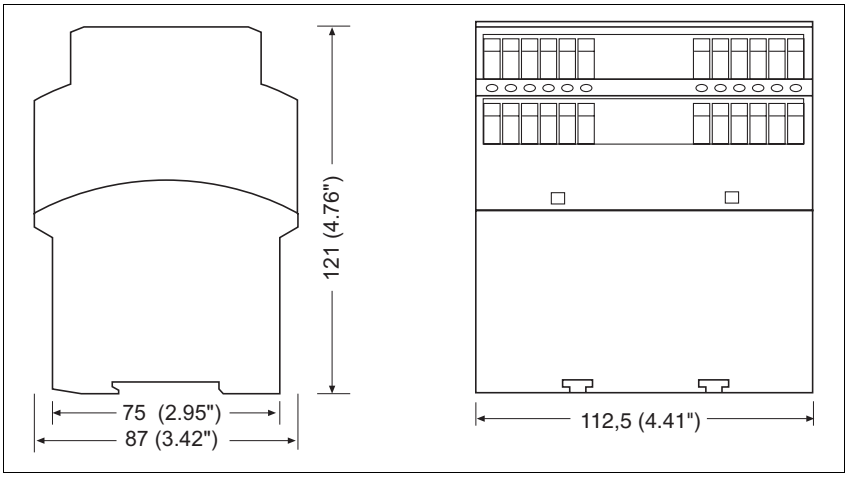
Terminal configuration



Installation

- The safety relay should be installed in a control cabinet with a protection type of at least IP54.
- Use the notch on the rear of the unit to attach it to a DIN rail.
- Ensure the unit is mounted securely on a vertical DIN rail (35 mm) by using a fixing element (e.g. retaining brakket or an end angle).

Dimensions



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

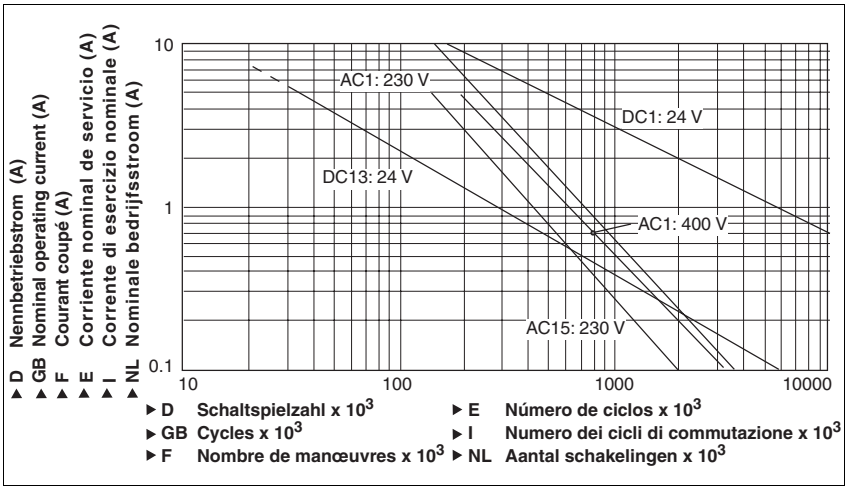
Category 4, EN 954-1
PNOZ 2VQ

Notice

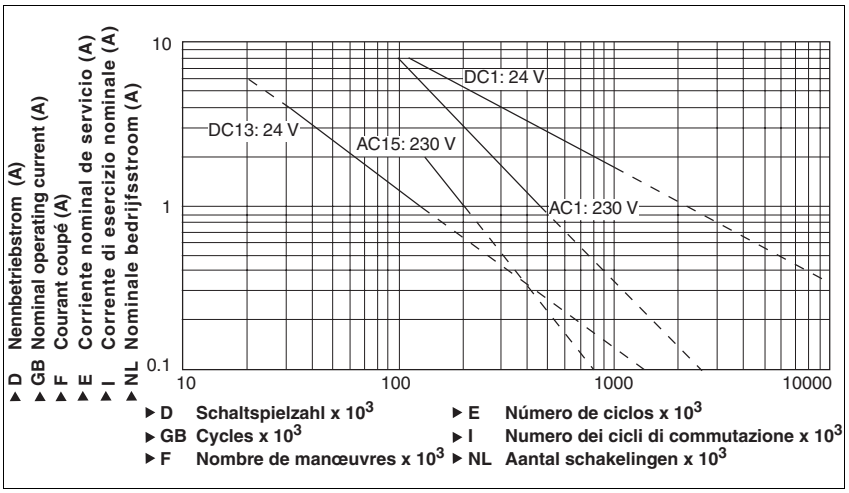
This data sheet is only intended for use during configuration. For installation and operation, please refer to the operating instructions supplied with the unit.

Service life graph

Instantaneous safety contacts:



Delayed safety contacts:



Technical details

Electrical data	
Supply voltage	
Supply voltage U_B DC	**24 V**
Voltage tolerance	**-15 %/+10 %**
Power consumption at U_B DC	**6.5 W**
Residual ripple DC	**160 %**
Voltage and current at	
Input circuit DC: **24.0 V**	**35.0 mA**
Reset circuit DC: **24.0 V**	**100.0 mA**
Feedback loop DC: **24.0 V**	**100.0 mA**
Number of output contacts	
Safety contacts (S) instantaneous:	**3**
Safety contacts (N/O), delayed:	**2**
Auxiliary contacts (N/C):	**1**

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Category 4, EN 954-1
PNOZ 2VQ

Electrical data	
Category of output contacts in accordance with **EN 954-1**, **EN ISO 13849-1**	
Safety contacts (S) instantaneous:	**4**
Delay time <30 s	**3**
Utilisation category in accordance with **EN 60947-4-1**	
Safety contacts: AC1 at **240 V**	I_{min}: **0.01 A** , I_{max}: **8.0 A** P_{max}: **2000 VA**
Safety contacts: AC1 at **400 V**	I_{min}: **0.01 A** , I_{max}: **5.00 A** P_{max}: **2000 VA**
Safety contacts: DC1 at **24 V**	I_{min}: **0.01 A** , I_{max}: **8.0 A** P_{max}: **200 W**
Safety contacts, delayed: AC1 at **240 V**	I_{min}: **0.01 A** , I_{max}: **4.0 A** P_{max}: **1000 VA**
Safety contacts, delayed: DC1 at **24 V**	I_{min}: **0.01 A** , I_{max}: **4.0 A** P_{max}: **100 W**
Auxiliary contacts: AC1 at **240 V**	I_{min}: **0.01 A** , I_{max}: **8.0 A** P_{max}: **2000 VA**
Auxiliary contacts: DC1 at **24 V**	I_{min}: **0.01 A** , I_{max}: **8.0 A** P_{max}: **200 W**
Utilisation category in accordance with **EN 60947-5-1**	
Safety contacts: AC15 at **230 V**	I_{max}: **5.0 A**
Safety contacts: DC13 at **24 V** (6 cycles/min)	I_{max}: **7.0 A**
Safety contacts, delayed: AC15 at **230 V**	I_{max}: **4.0 A**
Safety contacts, delayed: DC13 at **24 V** (6 cycles/min)	I_{max}: **4.0 A**
Auxiliary contacts: AC15 at **230 V**	I_{max}: **5.0 A**
Safety contacts, delayed: DC13 at **24 V** (6 cycles/min)	I_{max}: **7.0 A**
Contact material	**AgSnO2 + 0.2 µm Au**
External contact fuse protection (I_K = 1 kA) to **EN 60947-5-1**	
Blow-out fuse, quick	
Safety contacts:	**10 A**
Safety contacts, delayed:	**6 A**
Auxiliary contacts:	**10 A**
Blow-out fuse, slow	
Safety contacts:	**6 A**
Safety contacts, delayed:	**4 A**
Auxiliary contacts:	**6 A**
Circuit breaker 24 VAC/DC, characteristic B/C	
Safety contacts:	**6 A**
Safety contacts, delayed:	**4 A**
Auxiliary contacts:	**6 A**
Max. overall cable resistance R_{lmax} input circuits, reset circuits	
single-channel at U_B DC	**60 Ohm**
dual-channel without detect. of shorts across contacts at U_B DC	**120 Ohm**
dual-channel with detect. of shorts across contacts at U_B DC	**5 Ohm**
Times	
Switch-on delay	
with automatic reset typ.	**200 ms**
with automatic reset max.	**300 ms**
with automatic reset after power on typ.	**200 ms**
with automatic reset after power on max.	**300 ms**
with manual reset typ.	**200 ms**
with manual reset max.	**300 ms**

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Category 4, EN 954-1
PNOZ 2VQ

Times	
Delay-on de-energisation	
with E-STOP typ.	**15 ms**
with E-STOP max.	**30 ms**
with power failure typ.	**30 ms**
with power failure max.	**40 ms**
Recovery time at max. switching frequency 1/s	
after E-STOP	**50 ms +tv**
after power failure	**100 ms**
Delay time t_V: selectable	**0,10 s**; **0,20 s**; **0,30 s**; **0,40 s**; **0,50 s**; **0,60 s**; **0,70 s**; **0,80 s**; **1,00 s**; **1,50 s**; **2,00 s**; **3,00 s** Order no.: 774013 **1.00 s**, **2.00 s**, **3.00 s**, **4.00 s**, **5.00 s**, **6.00 s**, **7.00 s**, **8.00 s**, **10.00 s**, **12.00 s**, **15.00 s**, **20.00 s**
Repetition accuracy	**2 %**
Time accuracy	**-15 %/+15 % +50 ms**
Simultaneity, channel 1 and 2	**150 ms**
Supply interruption before de-energisation	**20 ms**
Environmental data	
EMC	**EN 60947-5-1**, **EN 61000-6-2**
Vibration to **EN 60068-2-6**	
Frequency	**10 - 55 Hz**
Amplitude	**0.35 mm**
Climatic suitability	**EN 60068-2-78**
Airgap creepage in accordance with **EN 60947-1**	
Pollution degree	**2**
Rated insulation voltage	**400 V**
Rated impulse withstand voltage	**4.0 kV**
Ambient temperature	**-10 - 55 °C**
Storage temperature	**-40 - 85 °C**
Protection type	
Mounting (e.g. cabinet)	**IP54**
Housing	**IP40**
Terminals	**IP20**
Mechanical data	
Housing material	
Housing	**PPO UL 94 V0**
Front	**ABS UL 94 V0**
Cross section of external conductors with screw terminals	
1 core flexible	**0.20 - 4.00 mm² , 24 - 10 AWG**
2 core, same cross section, flexible:	
with crimp connectors, without insulating sleeve	**0.20 - 2.50 mm² , 24 - 14 AWG**
without crimp connectors or with TWIN crimp connectors	**0.20 - 2.50 mm² , 24 - 14 AWG**
Torque setting with screw terminals	**0.60 Nm**
Dimensions	
Height	**87.0 mm**
Width	**112.5 mm**
Depth	**121.0 mm**
Weight	**600 g**

The standards current on **2008-07** apply.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Category 4, EN 954-1
PNOZ 2VQ

Conventional thermal current	
I_{th} (A) at U_B DC	
1 contact	**8.00 A**
2 contacts	**6.80 A**
3 contacts	**5.50 A**
4 contacts	**5.00 A**
5 contacts	**4.50 A**

Order reference

Type	Features	Terminals	Order no.
PNOZ 2VQ	24 VDC	Screw terminals	774 013

Pilz GmbH & Co. KG, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP