Honeywell

THE POWER OF **CONNECTED**

MICRO SWITCH Compact Limit Switches

NGC Series

002409

Issue 9

Datasheet

DESCRIPTION

Honeywell's MICRO SWITCH Compact Limit Switches, NGC Series, are a configurable platform of medium-duty switches that allow the customer to choose SPDT (single pole, double throw) or DPDT (double pole, double throw) circuitry while maintaining the same housing and mounting footprint throughout the NGC Series. MICRO SWITCH NGC Series can be configured more than 380,000 ways, carries global approvals, and are sealed to IP67 for potential use in indoor and outdoor applications.

VALUE TO CUSTOMERS

- **Cost-effective:** Provides a single source for a compact SPDT and DPDT limit switch, which can help minimize the Original Equipment Manufacturer's sourcing expenses by simplifying their supply chain
- **Versatile:** Durable packaging allows for use in many harsh indoor or outdoor applications, providing performance confidence
- **Configurable:** Allows design engineers to standardize on a single footprint while meeting a variety of electrical requirements
- **Application support:** Customers with a global footprint can count on Honeywell for regional support for new applications and troubleshooting

FEATURES

- SPDT or DPDT configurable circuitry
- Snap-action, positive-break contacts
- Silver alloy and gold-plated contact options
- UL, CE, cUL, and CCC approvals
- Conforms to IEC 60947-5-1, IEC 61373, EN45545-2 (metal variants with M12 connectors only)
- NEMA 1, 4, 12, 13; IP67 sealing
- Metal and plastic housing options
- Low and high temperature variants
- Cable and connector terminations
- Variety of heads and actuator levers

POTENTIAL INDUSTRIAL APPLICATIONS

- Boom position detection
- Elevators and escalators
- Machine tools
- Mobile light towers
- Packaging equipment
- Rail doors
- Scissor lifts

DIFFERENTIATION

- With two times the vibration (10 g) and shock (50 g) ratings of comparable competitive devices, the NGC Series can be implemented in the harshest of environmental conditions, providing enhanced reliability and repeatability
- Broader current capacity (10 A) than comparable devices allows for potential use in a wider set of applications, making platform standardization an easier task

PORTFOLIO

The NGC Series joins the 14CE, 914CE, LS, and E6/V6 Series of Medium-Duty Limit Switches. Honeywell also offers a portfolio of MICRO SWITCH Heavy-Duty Limit Switches and Global Limit Switches.

Table 1. Specifications

Characteristic	Parameter
Description	compact, medium-duty limit switches
Actuators	**Side Rotary Configurations** • Side rotary • Side rotary (short) • Side rotary with adjustable length roller lever • Reversed side rotary (short) • Reversed side rotary with adjustable length roller lever **Plunger Configurations** • Pin plunger (standard 4,8 mm [0.19 in] and long 7,4 mm [0.29 in]) • Roller plunger (standard 15,3 mm [0.60 in] and long 17,85 mm [0.70 in]) • Cross roller plunger (standard 15,3 mm [0.60 in] and long 17,85 mm [0.70 in]) • Pin plunger with boot seal • Panel-mount pin plunger • Panel-mount roller plunger • Panel-mount cross roller plunger • Panel-mount pin plunger with boot seal • Top roller lever arm
Terminations (SPDT)	Normal cable (refer to table 4) PUR cable (refer to table 4) Special application cable (refer to table 4) Railway cable (refer to table 4) Connector, 4-pin male, M12 thread Connector, 5-pin male, M12 thread
Terminations (DPDT)	Normal cable (refer to table 4) PUR cable (refer to table 4) Special application cable (refer to table 4) Railway cable (refer to table 4)
Material approval standard	(only applicable for product with non-halogen cable) DIN5510-2-2009 (flammability rating: S3; smoke rating: > SRI; welt rating: ST2; toxic gas rating: FED(TZUL=15min)< 1)
Switching options	SPDT, DPDT; snap action contacts (1NC/1NO, 2NC/2NO)
Sealing	NEMA 1, 4, 12, 13; IP67 per IEC 60529 suitable for outdoor applications
Contacts	snap action, positive break standard: silver alloy; gold: gold-plated
Operating temperature	-25 °C to 75 °C [-13 °F to 167 °F] (for extended operating temperature options, see Table 3)
Storage temperature	-40 °C to 85 °C [-40 °F to 185 °F]
Mechanical endurance	1NC/1NO: 5 M cycles min. at 120 CPM 2NC/2NO: 5 M cycles min. at 60 CPM – for AgNi contacts only
Electrical life	see table 3
Contact bounce limit	50 msec max., use proper signal filter accordingly
Thermal current	1NC/1NO: 10 A; 2NC/2NO: 5 A
Rated insulation voltage (Ui)	1NC/1NO: 400 V as per IEC 60947-5-1 2NC/2NO: 250 V as per IEC 60947-5-1
Dielectric strength	1890 Vac for metal housing; 2890 Vac for plastic housing 1500 Vac between all terminals to enclsoure after durability test
Impulse voltage	1NC/1NO: 2500 Vdc as per IEC 60947-5-1 2NC/2NO: 1500 Vac as per IEC 60947-5-1
Pollution degree	3 (III)
Humidity	95 %RH max.
Operating speed	0,3 mm/s to 2 m/s
Switching frequency	1NC/1NO: 120 CPM max. 2NC/2NO: 60 CPM max.
Shock	50 g for 11 μs as per IEC 60068-2-27; railway application, per IEC 61373 Class I Car B type
Vibration	10 g as per IEC 60068-2-6, frequency range 10 Hz to 500 Hz; railway application per IEC 61373 Class I Car B type
Approvals	UL (UL508), cUL, CE (IEC 60947-5-1), CCC (GB14048.5-2008)
Conforming to standards	IEC 60947-5-1, IEC 61373, EN45545-2 HL 3 (metal variants with M12 connectors only)

MICRO SWITCH Compact Limit Switches, NGC Series

Table 2. Electrical Rating and Utilization Category

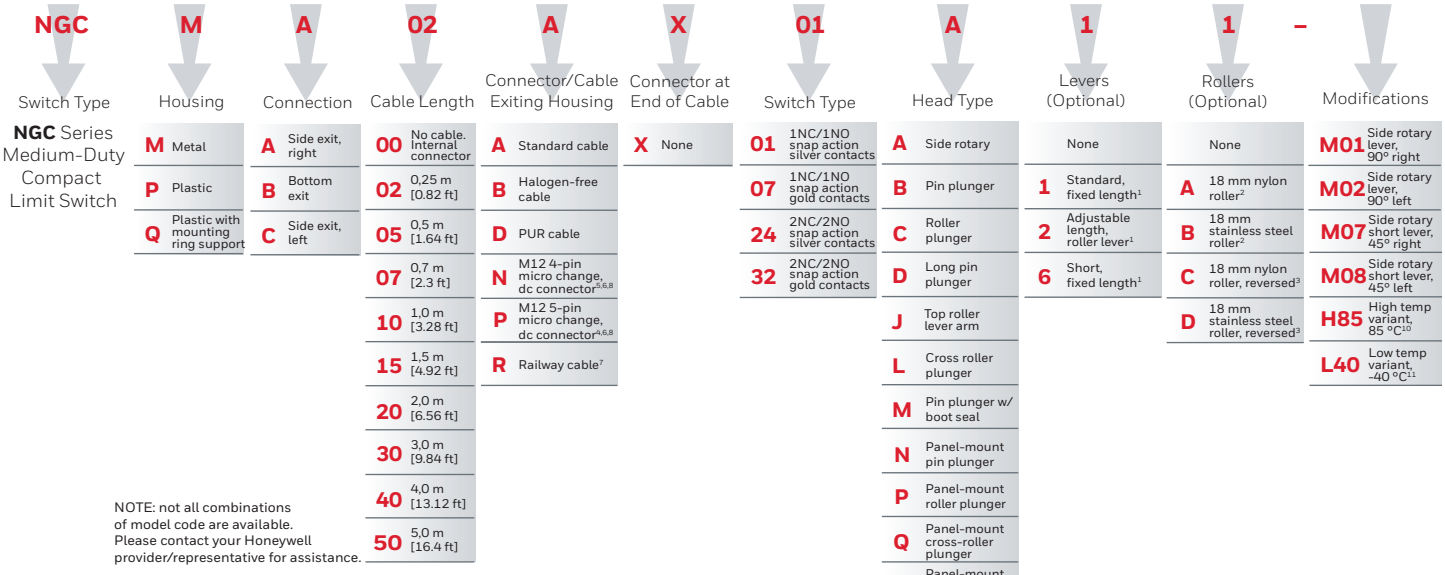
SPDT 1NO/1NC				DPDT 2NO/2NC				SPDT and DPDT
ac		dc		ac		dc		gold-plated contacts
A300 Ue (volts)	AC15 Ie (amps)	Q300 Ue (volts)	DC13 Ie (amps)	C300 Ue (volts)	AC15 Ie (amps)	R300 Ue (volts	DC13 Ie (amps)	
120	6	125	0.55	240	0.75	250	0.1	30 mVdc 10 mA resistive
240	3	250	0.27					
Per IEC 60947-5-1 and UL 508								

Table 3. Electgrical Life Expectancy at Illustrated Load

Switch Type	Voltage	Current	Life
SPDT (01) silver contact[1]	110 Vdc	1A	500,000
DPDT (24) silver contact[1]	110 Vdc	1 A	500,000
DPDT (24) silver contact[2]	24 Vdc	15 mA	1,500,000
DPDT (32) gold-plated contact[2]	30 mVdc	10 mA	50,000
SPDT (07) gold-plated contact[2]	30 mVdc	10 mA	50,000

[1] 15 cycles/minute max. Applicable to NC circuit only. All loads resistive. Life mentioned are min. life.
[2] 30 cycles/minute max. All loads resistive. Life mentioned are min. life.

Figure 1. Product Nomenclature and Order Guide



NOTE: not all combinations of model code are available. Please contact your Honeywell provider/representative for assistance.

[1] Only applicable for head type "A"
[2] Only applicable for lever types "1, 2, 6" and switch types "01" and "07"
[3] Only applicable for lever types "2, 6"
[4] Only applicable for metal housing Type "M"
[5] Typically applicable for plastic housing Type "P" and "Q", and without grounding metal housing Type "M"
[6] Only applicable for switch type "01" and "07"
[7] Cable meets EN 50306, but does not meet with UL requirement
[8] Only applicable for "00" cable length. Not applicable to switch types "24" and "32"
[9] "00" cable length is not applicable for connector/cable exit type "A", "B", "D", and "R". Not applicable to switch types "24" and "32"
[10] DIN 5510-2-2009 does not apply to NGC variant with suffix modification code "H85". Also applicable only for connector/cable types "B", "R", "N", and "P". See table 3
[11] Modification code "L40" is a -40 °C variant. Only applicable to connector/cable types "B", "R", "N", and "P". See table 3

Table 4. Connector/Cable Type Temperature Options[10, 11]

Connector/Cable type	Standard NGC Series (with modification code, none)		High Temp NGC Series (with modification code, H85)		Low Temp NGC Series (with modification code, L40)	
	Tmin	Tmax	Tmin	Tmax	Tmin	Tmax
A	-25 °C	75 °C	–	–	–	–
B	-25 °C	75 °C	-25 °C	85 °C	-40 °C	75 °C
D	-25 °C	75 °C	–	–	–	–
R	-25 °C	75 °C	-25 °C	85 °C	-40 °C	75 °C
N	-25 °C	75 °C	-25 °C	85 °C	-40 °C	75 °C
P	-25 °C	75 °C	-25 °C	85 °C	-40 °C	75 °C

Figure 2. Connector Dimensions and Pin-Out Identification

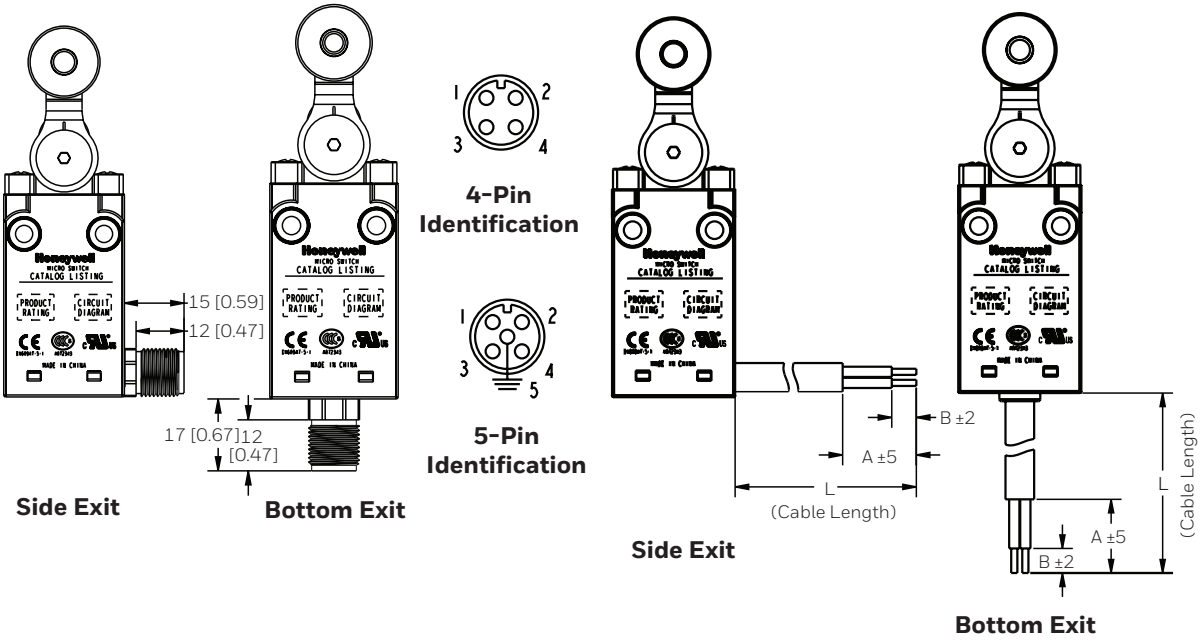
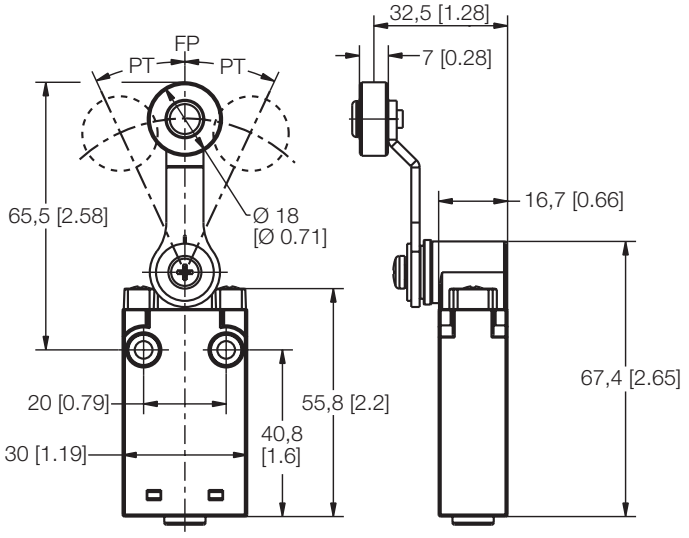


Table 5. Cable Descriptions

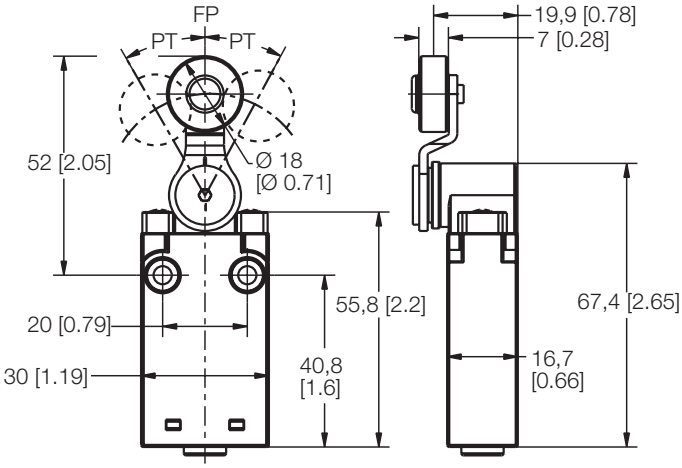
Listing	Cable Description						
	Length (L) min.	Jacket strip length (A)	Insulation strip length (B)	NGCP*01* NGCP*07* (01 or 07 switch type)	NGCM*01* NGCM*07* (01 or 07 switch type)	NGCP*24* NGCP*32* (24 or 32 switch type)	NGCM*24* NGCM*32* (24 or 32 switch type)
NGC*00*	no cable (internal connector)						
NGC*02*	0,25 m [9.8 in]	23 mm [0.91 in]	5 mm [0.20 in]	18 AWG or 4 x 0,75 mm^2	18 AWG or 5 x 0,75 mm^2	20 AWG or 8 x 0,5 mm^2	20 AWG or 9 x 0,5 mm^2
NGC*05*	0,5 m [19,7]	32 mm [1.26]	17 mm [0.67 in]				
NGC*07*	0,7 m [27.6 in]	32 mm [1.26]	17 mm [0.67 in]				
NGC*10*	1 m [39.37 in]	23 mm [0.91 in]	5 mm [0.20 in]				
NGC*15*	1,5 m [59 in]	23 mm [0.91 in]	5 mm [0.20 in]				
NGC*20*	2 m [78.74 in]	23 mm [0.91 in]	5 mm [0.20 in]				
NGC*30*	3 m [9.84 ft]	23 mm [0.91 in]	5 mm [0.20 in]				
NGC*40*	4 m [13.12 ft]	23 mm [0.91 in]	5 mm [0.20 in]				
NGC*50*	5 m [16.4 ft]	23 mm [0.91 in]	5 mm [0.20 in]				

Figure 3. Side Rotary A1A/A1B Dimensions



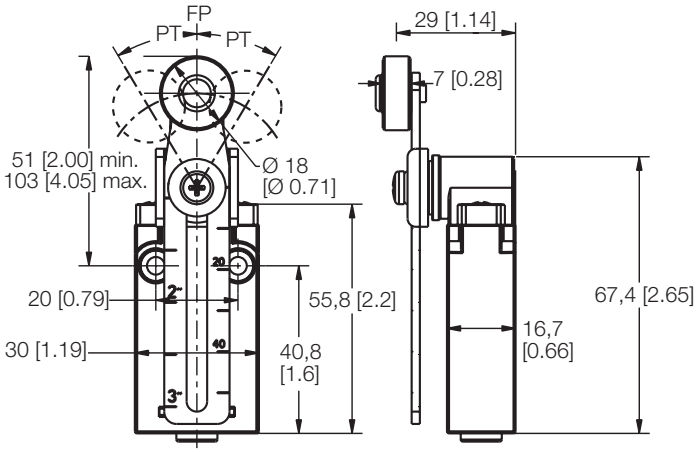
Type A1A/A1B • Side Rotary

Figure 4. Side Rotary A6A/A6B Dimensions



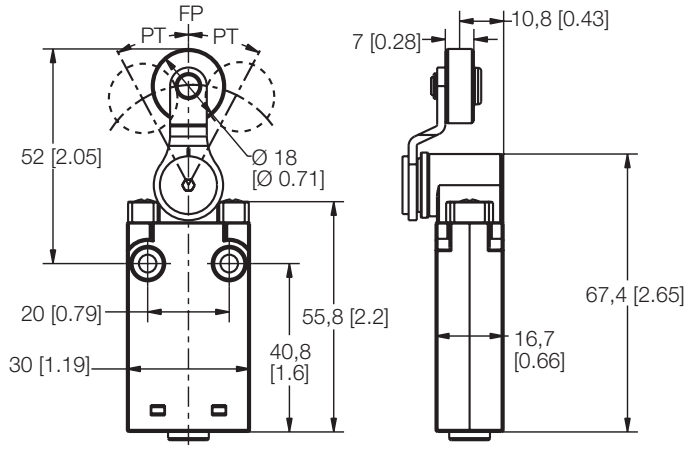
Type A6A/A6B • Side Rotary (Short)

Figure 5. Side Rotary A2A/A2B Dimensions



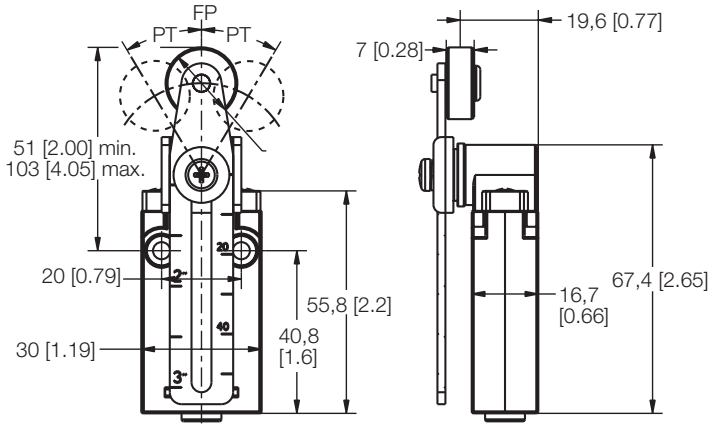
Type A2A/A2B • Side Rotary with Adjustable Length Roller Lever

Figure 6. Side Rotary A6C/A6D Dimensions



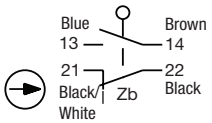
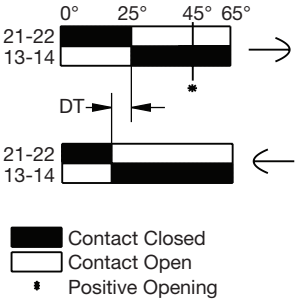
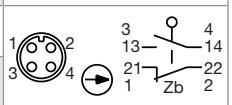
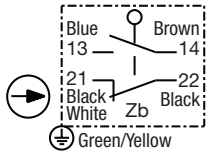
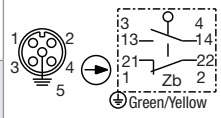
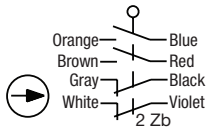
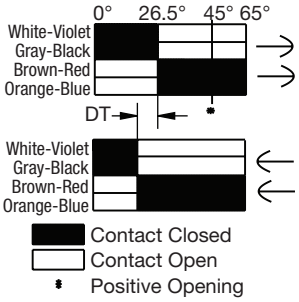
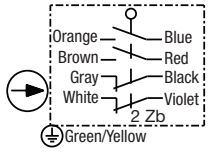
Type A6C/A6D • Reversed Side Rotary (Short)

Figure 7. Side Rotary A2C/A2D Dimensions



Type A2C/A2D • Reversed Side Rotary with Adjustable Length Roller Lever

Table 5. Side Rotary Operating Characteristics

Actuation	Catalog Listing	Connector/ Cable Exit	Switch Type	Circuit Diagram	Bar Charts	Differential Travel max.	Operating Force/ Torque max.	Release Force/ Torque max.
Side Rotary	NGCP*****X01A**	A	01			15°	18 Ncm [1.59 in-lb]	2,5 Ncm [0.22 in-lb]
	NGCP*****X01A**	B						
	NGCP*****X01A**	D						
	NGCP*****X07A**	A	07					
	NGCP*****X07A**	B						
	NGCP*****X07A**	D						
	NGCP*****X01A**	N	01					
	NGCP*****X07A**	N	07					
	NGCM*****X01A**	A	01					
	NGCM*****X01A**	B						
	NGCM*****X01A**	D						
	NGCM*****X07A**	A	07					
	NGCM*****X07A**	B						
	NGCM*****X07A**	D						
	NGCM*****X01A**	P	01					
	NGCM*****X07A**	P	07					
	NGCP*****X24A**	A	24			16.5°	17 Ncm [1.5 in-lb]	2,1 Ncm [0.19 in-lb]
	NGCP*****X24A**	B						
	NGCP*****X24A**	D						
	NGCP*****X32A**	A	32					
	NGCP*****X32A**	B						
	NGCP*****X32A**	D						
	NGCM*****X24A**	A	24					
	NGCM*****X24A**	B						
	NGCM*****X24A**	D						
	NGCM*****X32A**	A	32					
	NGCM*****X32A**	B						
	NGCM*****X32A**	D						

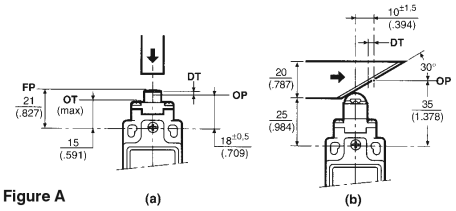


Figure A

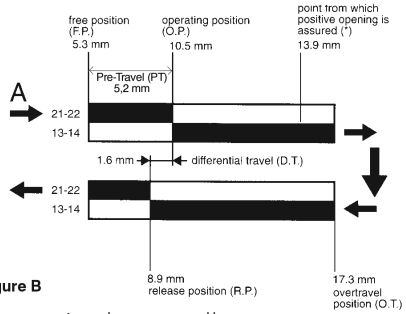


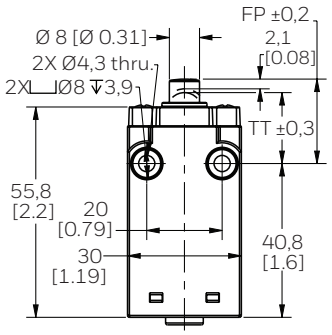
Figure B

How to read and understand the bar chart information

The following example relates to a unit which has a snap action basic and which has a roller pin plunger actuator. Follow the black arrows and the black strip on the chart. The black strip indicates that there is a circuit between the terminals whose numbers are shown on the left and when white there is no circuit.

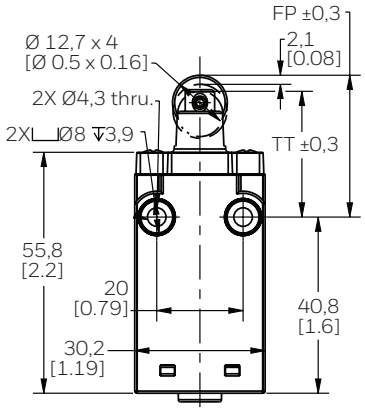
Look at Figures A and B as examples. Actuator type used for test is the linear Cam travel type (b) shown left. The start point is at the arrow marked "A" (See fig. B). This shows the free position to be 5.3 mm from the vertical center line of the unit. At this stage there is a circuit between the terminals 21-22 but no circuit between terminals 13-14. The unit can be actuated until it reaches the operating position which is 10,5 mm from the center line – a travel distance of 10,5 – 5,3 = 5,2 mm from the free position. At this point the circuit arrangement changes – no circuit between 21-22 but making a circuit between 13-14. If, however, the contacts of terminals 21-22 weld together and will not separate, a mechanical safety feature will take effect if the switch is travelled past the point from which positive opening is assured, 13,9 mm. As the switch returns it reaches the release position at 8,9 mm from the center line. The circuit will change back to the original state and the difference between the operating position and the release position gives what is known as the differential travel i.e. 10,5 – 8,9 = 1,6 mm. The asterisk (*) indicates the point from which the positive opening is assured.

Figure 8. Pin Plunger B & D Dimensions



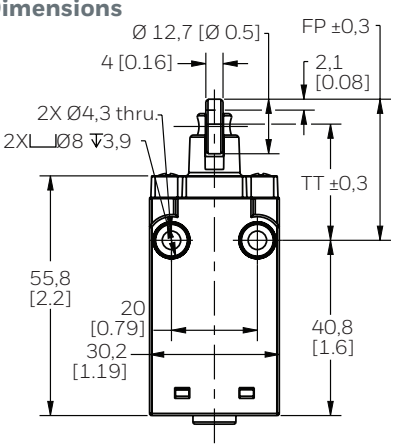
NGC_B | FP 19,8 mm; TT 15,9 mm
NGC_D | FP 22,4 mm; TT 18,5 mm
Pin Plunger

Figure 9. Roller Plunger C & S Dimensions



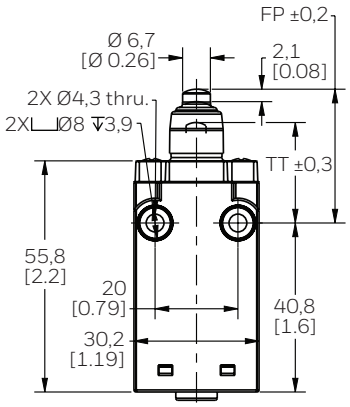
NGC_C | FP 30,3 mm; TT 26,4 mm
NGC_S | FP 32,85 mm; TT 28,95 mm
Roller Plunger

Figure 10. Cross Roller Plunger L & T Dimensions



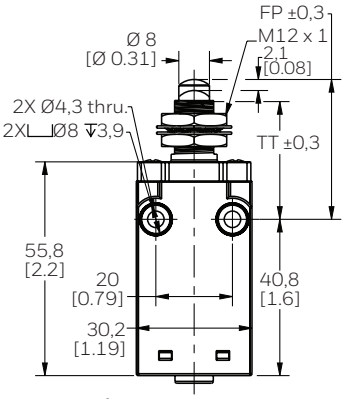
NGC_L | FP 30,3 mm; TT 26,4 mm
NGC_T | FP 32,85 mm; TT 28,95 mm
Cross Roller Plunger

Figure 11. Pin Plunger with Boot Seal M Dimensions



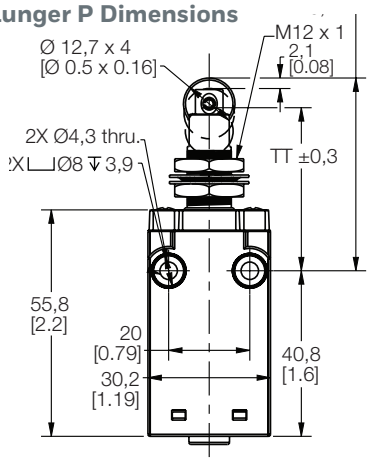
NGC_M | FP 32,3 mm; TT 28,4 mm
Pin Plunger with Boot Seal

Figure 12. Panel-Mount PIn Plunger N Dimensions



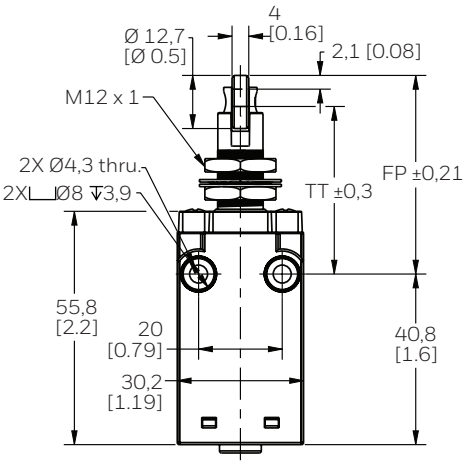
NGC_N | FP 36,5 mm; TT 32,6 mm
Panel Mount Pin Plunger

Figure 13. Panel-Mount Roller Plunger P Dimensions



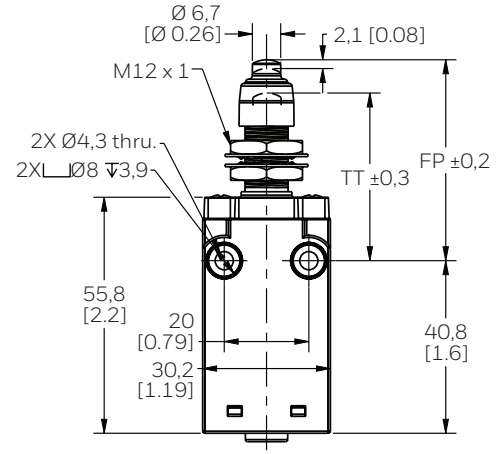
NGC_P | FP 47,5 mm; TT 43,6 mm
Panel-Mount Roller Plunger

Figure 14. Panel-Mount Cross Roller Plunger Q Dimensions



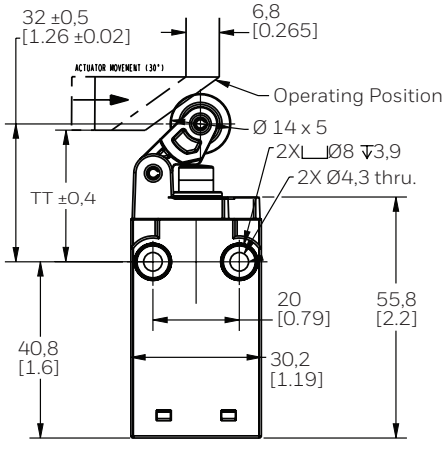
NGC_Q | FP 47,5 mm; TT 43,6 mm
Panel-Mount Cross Roller Plunger

Figure 15. Panel-Mount PIn Plunger With Boot Seal R Dimensions



NGC_R | FP 47,5 mm; TT 43,6 mm
Panel-Mount Pin Plunger with Boot Seal

Figure 16. Top Roller Lever Arm J Dimensions



NGC_J | TT 33,3 mm
Top Roller Lever Arm

Figure 17. Wedge Actuation

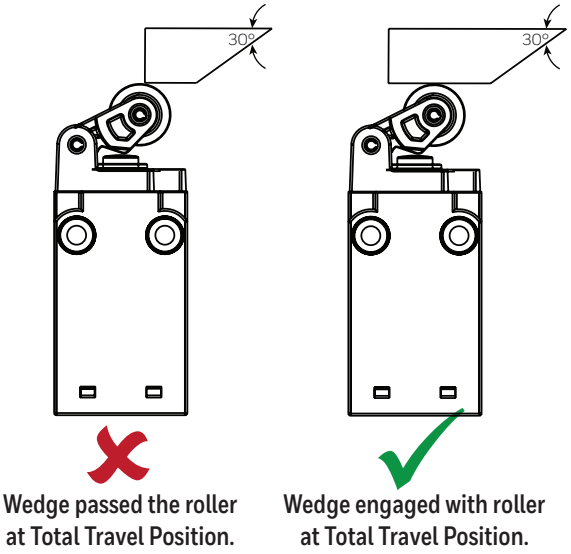
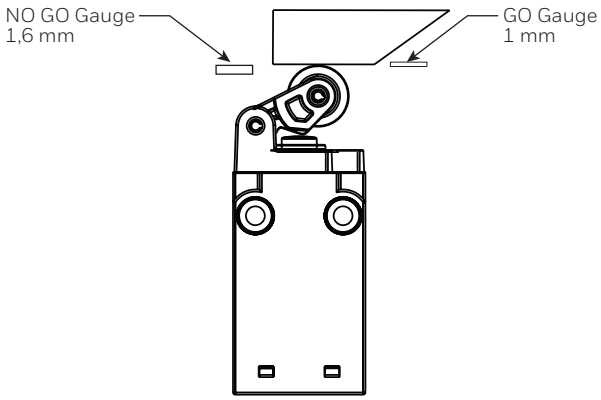


Figure 18. Final Installation Check at TTP



NOTE: Strictly adhere to installation instruction mentioned in Figures 1 to 18. Failure to comply with these could result in a functional issue.

Table 6. Plunger Operating Characteristics

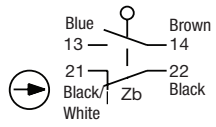
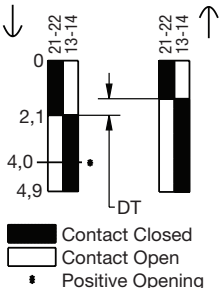
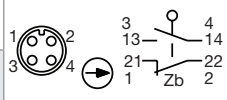
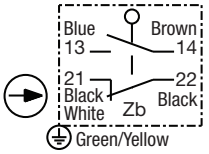
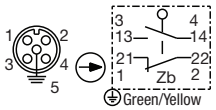
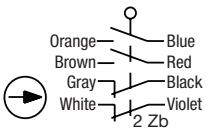
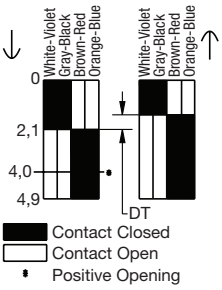
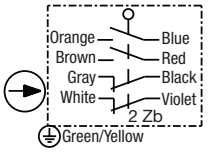
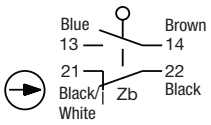
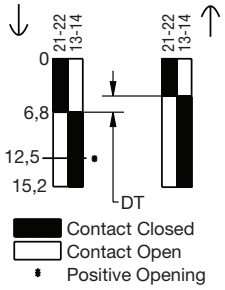
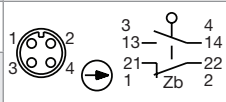
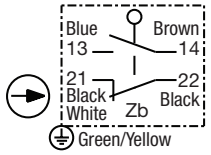
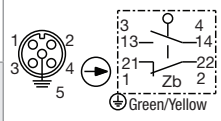
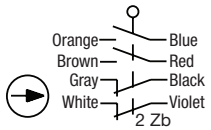
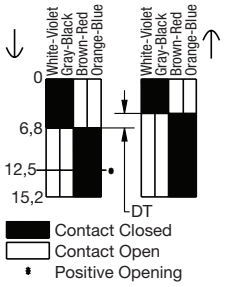
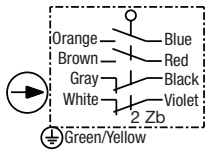
Actuation	Catalog Listing	Connector/ Cable Exit	Switch Type	Circuit Diagram	Bar Charts	Differential Travel max.	Operating Force/ Torque max.	Release Force/ Torque max.
Plunger Head	NGCP*****X01 B/C/D/L/M/N/P/Q/R/S/T	A	01			1,2 mm [0.047 in]	11 N [2.47 lb]	3 N [0.67 lb]
	NGCP*****X01 B/C/D/L/M/N/P/Q/R/S/T	B						
	NGCP*****X01 B/C/D/L/M/N/P/Q/R/S/T	D						
	NGCP*****X07 B/C/D/L/M/N/P/Q/R/S/T	A	07					
	NGCP*****X07 B/C/D/L/M/N/P/Q/R/S/T	B						
	NGCP*****X07 B/C/D/L/M/N/P/Q/R/S/T	D						
	NGCP*****X01 B/C/D/L/M/N/P/Q/R/S/T	N	01					
	NGCP*****X07 B/C/D/L/M/N/P/Q/R/S/T	N	07					
	NGCM*****X01 B/C/D/L/M/N/P/Q/R/S/T	A	01					
	NGCM*****X01 B/C/D/L/M/N/P/Q/R/S/T	B						
	NGCM*****X01 B/C/D/L/M/N/P/Q/R/S/T	D						
	NGCM*****X07 B/C/D/L/M/N/P/Q/R/S/T	A	07					
	NGCM*****X07 B/C/D/L/M/N/P/Q/R/S/T	B						
	NGCM*****X07 B/C/D/L/M/N/P/Q/R/S/T	D						
	NGCM*****X01 B/C/D/L/M/N/P/Q/R/S/T	P	01					
	NGCP*****X07 B/C/D/L/M/N/P/Q/R/S/T	P	07					
	NGCP*****X24 B/C/D/L/M/N/P/Q/R/S/T	A	24			1,4 mm [0.051 lb]	9,5 N [2.14 lb]	2,2 N [0.49 lb]
	NGCP*****X24 B/C/D/L/M/N/P/Q/R/S/T	B						
	NGCP*****X24 B/C/D/L/M/N/P/Q/R/S/T	D						
	NGCP*****X32 B/C/D/L/M/N/P/Q/R/S/T	A	32					
	NGCP*****X32 B/C/D/L/M/N/P/Q/R/S/T	B						
	NGCP*****X32 B/C/D/L/M/N/P/Q/R/S/T	D						
	NGCM*****X24 B/C/D/L/M/N/P/Q/R/S/T	A	24					
	NGCM*****X24 B/C/D/L/M/N/P/Q/R/S/T	B						
	NGCM*****X24 B/C/D/L/M/N/P/Q/R/S/T	D						
	NGCM*****X32 B/C/D/L/M/N/P/Q/R/S/T	A	32					
	NGCM*****X32 B/C/D/L/M/N/P/Q/R/S/T	B						
	NGCM*****X32 B/C/D/L/M/N/P/Q/R/S/T	D						

Table 7. Top Roller Arm Operating Characteristics, Head Type J

Actuation	Catalog Listing	Connector/ Cable Exit	Switch Type	Circuit Diagram	Bar Charts	Differential Travel max.	Operating Force/ Torque max.	Release Force/ Torque max.
Top Roller Arm	NGCP*****X01 J	A	01			4 mm [0.157 in]	5,5 N [1.24 lb]	1,2 N [0.27 lb]
	NGCP*****X01 J	B						
	NGCP*****X01 J	D						
	NGCP*****X07 J	A	07					
	NGCP*****X07 J	B						
	NGCP*****X07 J	D						
	NGCP*****X01 J	N	01					
	NGCP*****X07 J	N	07					
	NGCM*****X01 J	A	01					
	NGCM*****X01 J	B						
	NGCM*****X01 J	D						
	NGCM*****X07 J	A	07					
	NGCM*****X07 J	B						
	NGCM*****X07 J	D						
	NGCM*****X01 J	P	01					
	NGCP*****X07 J	P	07					
	NGCP*****X24 J	A	24			4,3 mm [0.169 in]	4,5 N [1.01 lb]	1,2 N [0.27 lb]
	NGCP*****X24 J	B						
	NGCP*****X24 J	D						
	NGCP*****X32 J	A	32					
	NGCP*****X32 J	B						
	NGCP*****X32 J	D						
	NGCM*****X24 J	A	24					
	NGCM*****X24 J	B						
	NGCM*****X24 J	D						
	NGCM*****X32 J	A	32					
	NGCM*****X32 J	B						
	NGCM*****X32 J	D						

ADDITIONAL MATERIALS

The following associated literature is available on the Honeywell web site at sensing.honeywell.com:

- Product line guide
- Product part listing/nomenclature tree
- Product range guide
- Application note

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IMPROPER INSTALLATION

- Consult with local safety agencies and their requirements when designing a machine-control link, interface, and all control elements that affect safety.
- Strictly adhere to all installation instructions.

Failure to comply with these instructions could result in death or serious injury.

⚠ WARNING
IMPROPER OPERATION

- For safety-related applications, always use normally closed (NC) contact. Normally open (NO) contact of a second switch can be used to achieve redundancy.
- Ensure that the switch actuator achieves sufficient travel for positive opening of normally closed (NC) contact to occur.

Failure to comply with these instructions could result in death or serious injury.

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MISUSE OF DOCUMENTATION

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
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Failure to comply with these instructions could result in death or serious injury.

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