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Sensing and Control

Honeywell Inc.

11 West Spring Street

Freeport, IL 61032

GENERAL INFORMATION

The GLS series is specifically designed for world-wide applications and is supported by Honeywell global resources for sales and after sales service.

Over 300 versions designed to the newest IEC standard are available and include a wide range of EN50041 and EN50047 type switches. Miniature EN50047 limit switches are available in metal and double insulated enclosures and a metal enclosed 3-cable entry version (EN50047 mounting compatible) is also offered. The larger EN50041 switches include metal enclosed standard and plug-in versions.

Standard GLS switch circuit variations include 2 and 4-circuit snap action versions with forced disconnect mechanism and two 2-circuit slow make and break versions. Two-circuit bifurcated contact versions allow direct PLC interface. Plug-in GLS switch types feature a 2-circuit snap action switch with forced disconnect.

GLS includes features to make quick installation easier and safer. Screwdriver guides, wire guides and finger guard protection are provided.

Customers will benefit from Honeywell's vast experience in serving world industries over many years. To minimize plant downtime and reduced maintenance costs, the GLS series includes plug-in and indicator switches with single or twin LEDs.

All EN50041 products feature modular constructions. Head, body or basic switch components are available separately as replacement parts. GLS allows end user maintenance inventories and costs to be contained. Most GLS versions are interchangeable with almost all other makes of EN50041/47 switches.

TYPICAL APPLICATIONS

- Machine tools: metal fabrication equipment, presses, transfer lines and special machinery
- Material handling equipment: conveyors, elevators, cranes and hoists
- Packaging machinery and process equipment
- Textile machinery
- Construction machinery and equipment, vehicles and lift trucks

FEATURES

- Designed to the new IEC standard for world-wide applications
- EN50041 metal standard and plug-in versions
- EN50047 metal and double insulated versions
- EN50047 mounting compatible, 3-cable entry metal versions
- UL, CSA, and CE
- Sealing up to IP 67/NEMA 4
- International conduit sizes
- Snap action and slow action mechanism with forced disconnect
- Direct PLC interface compatible (two circuit)
- Galvanically isolated contacts (two circuit)
- Modular construction reduces maintenance parts costs
- Design for ease of installation
- Five basic switch versions
- Wide choice of actuators

“300” denotes the maximum rated (DC) voltage.

These IEC standards have been adopted by CENELEC (The European Committee for Electrotechnical Standardization) and have been identified by replacing IEC with EN 60 e.g.

IEC 947-5-1 then becomes **EN 60947-5-1**.

CENELEC has defined the dimensions and characteristics of two types of limit switch in the standards **EN 50041** and **EN 50047**.

These standards relate to **Low voltage switchgear and control-gear for industrial use** and define the enclosure dimensions, the operating point for various head actuators, the earth terminal requirement, the terminal marking and the minimum degree of IP protection.

ELECTRICAL RATINGS

| IEC947-5-1 / EN60947-5-1 | | | | | | | | | |
|------------------------------------|------|--|------|------|------|------|------|-----------|-------|
| Designation & Utilization Category | | Rated operational current Ie (A) at rated operational voltage Ue | | | | | | VA rating | |
| | | 120V | 240V | 380V | 480V | 500V | 600V | Make | Break |
| AC15 | A600 | 6 | 3 | 1.9 | 1.5 | 1.4 | 1.2 | 7200 | 720 |
| AC15 | A300 | 6 | 3 | — | — | — | — | 7200 | 720 |
| AC15 | B300 | 3 | 1.5 | — | — | — | — | 3600 | 360 |
| AC14 | D300 | 0.6 | 0.3 | — | — | — | — | 432 | 72 |
| | | 125V 250V | | | | | | | |
| DC13 | Q300 | 0.55 | 0.27 | | | | | | |
| DC13 | R300 | 0.22 | 0.1 | | | | | | |

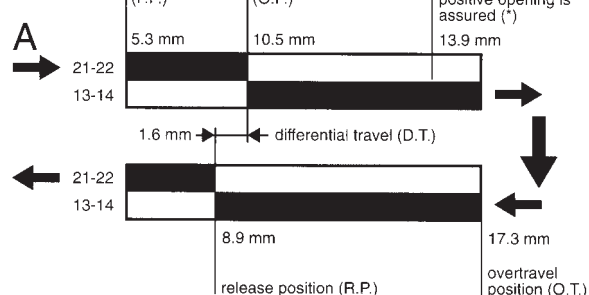


Figure B

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.

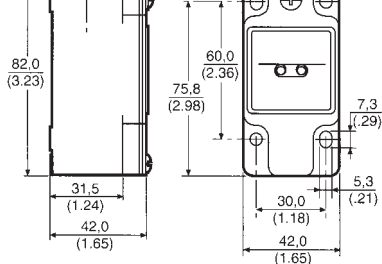
| First Digit | Protection against ingress of solid objects |
|-------------|--|
| IP | TEST |
| 0 | no protection |
| 1 | protected against solid objects with a diameter greater than 50 mm. |
| 2 | protected against solid objects with a diameter greater than 12 mm. |
| 3 | protected against solid objects with a diameter greater than 2.5 mm. |
| 4 | protected against solid objects with a diameter greater than 1 mm. |
| 5 | protected against dust-limited ingress (no harmful deposit) |
| 6 | totally protected against dust |

| Second Digit | Protection against ingress of water |
|--------------|--|
| IP | TEST |
| 0 | no protection |
| 1 | protected against vertically falling drops of water. |
| 2 | protected against vertically falling drops of water when the enclosure is tilted at an angle up to 15 degrees. |
| 3 | protected against water sprayed at an angle of 60 degrees from the vertical |
| 4 | protected against splashing water from all directions – limited ingress (no harmful effects) |
| 5 | protected against low pressure jets of water from all directions – limited ingress permitted |
| 6 | protected against powerful jets of water from all directions – limited ingress permitted |
| 7 | protected against the effects of temporary immersion in water |
| 8 | protected against the effects of continuous immersion in water |

Type 12 enclosures are intended for indoor use primarily to provide a degree of protection against dust, spraying water, oil and non-corrosive coolant.

Note: Enclosures are based, in general, on the broad definitions outlined in NEMA Standards. Therefore, it will be necessary to ascertain that a particular enclosure will be adequate when exposed to the specific conditions that might exist in intended applications. Except as might otherwise be noted, all references to products relative to NEMA enclosure type are based on Honeywell evaluation and Underwriter's Laboratory (UL) tested.

This NEMA Standards Publication does test for environmental conditions such as corrosion, rust, icing, oil, and coolants. The IEC 529 does not, and does not specify degree of protection against mechanical damage of equipment. For this reason, and because the tests and evaluations for other characteristics are not identical, the IEC Enclosure Classification Designations cannot be exactly equated with NEMA Enclosure Type Numbers.



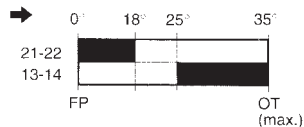
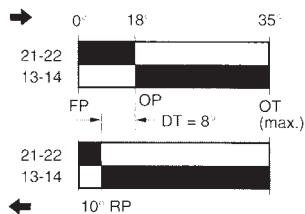
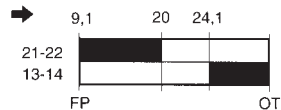
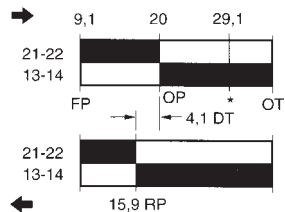
Conduit Thread

| | | | |
|------------|----------|----------|------------|
| Std = | A | A | = 1/2" NPT |
| (w/1LED) = | F | B | = PG 13,5 |
| (w/2LED) = | H | C | = 20 mm |
| | | D | = PF 1/2 |

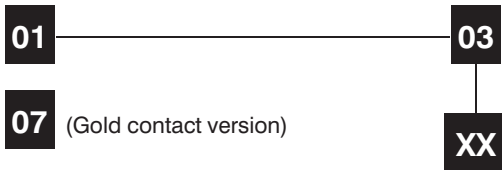
Ordering: ↓ ↓

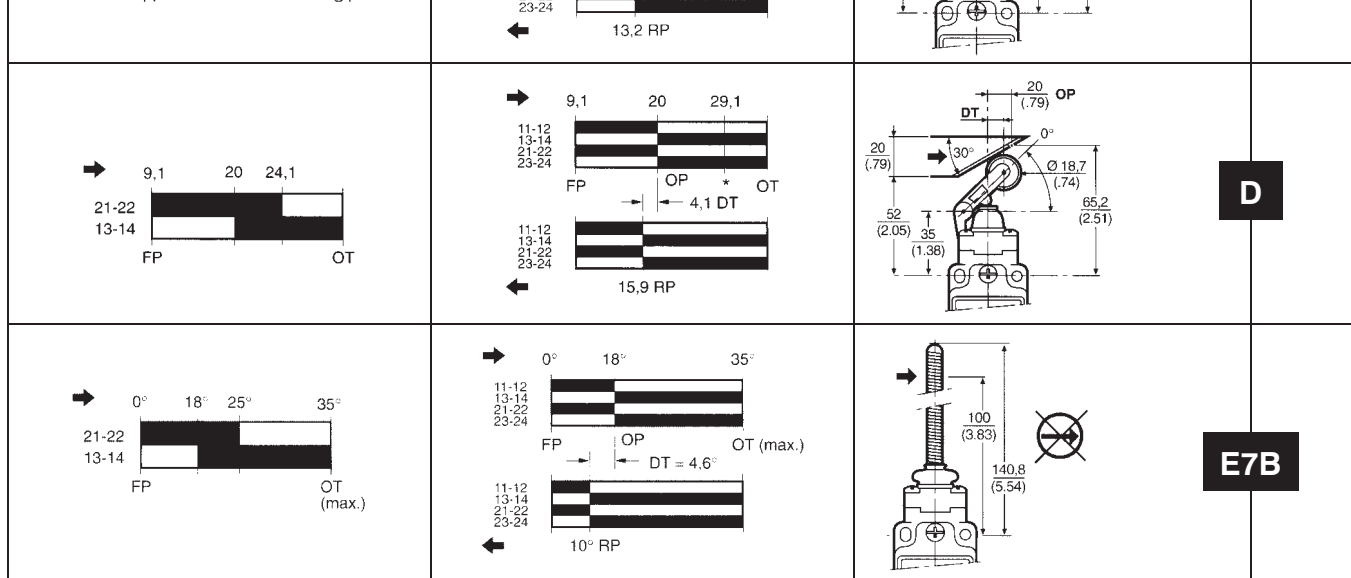
GL **X** **X**

Example: GLA B 01 B — GLF B 01 B — GLH B 01 B



* Point from which the positive opening is assured.





D

E7B

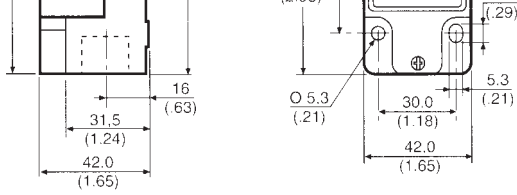
04

(GLA)
20

or

(GLF, GLH)
24

XXX



Conduit Thread

Plug-in = **B** **A** = 1/2" NPT

(w/1LED) = **G** **B** = PG 13,5

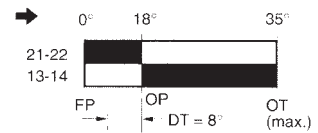
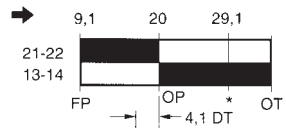
(w/2LED) = **J** **C** = 20 mm

D = PF 1/2

Ordering:

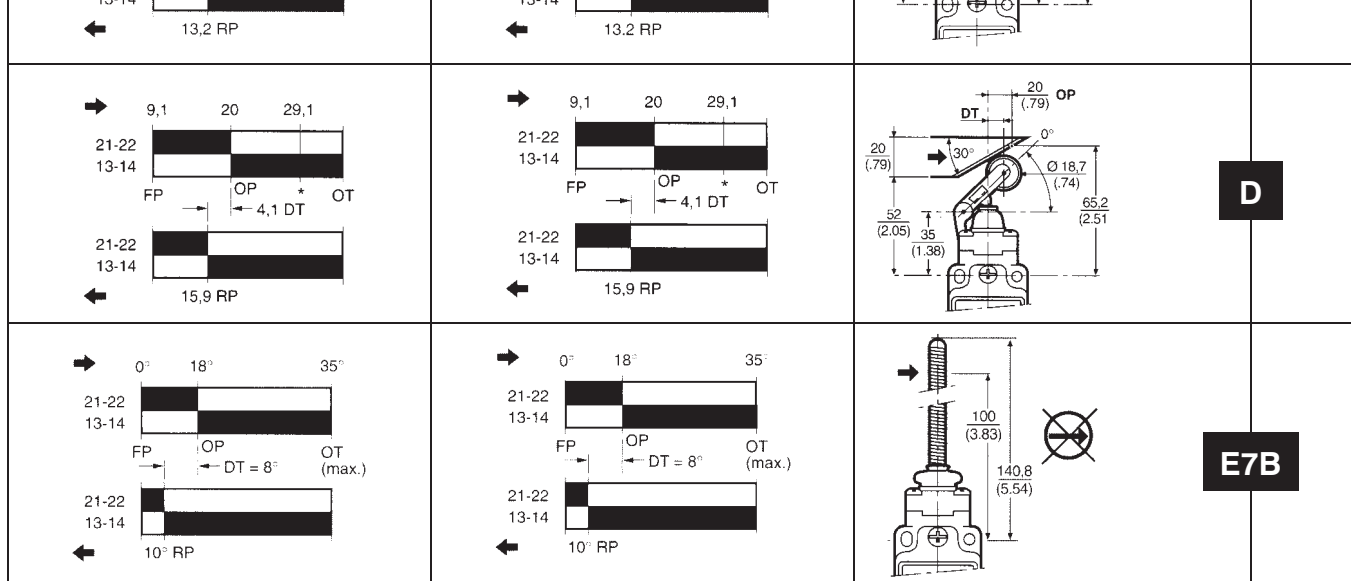


Example: GLB B 02 B — GLG B 12 B — GLJ B 13 B



* Point from which the positive opening is assured.
(GLB only)

02



(GLG only)

12

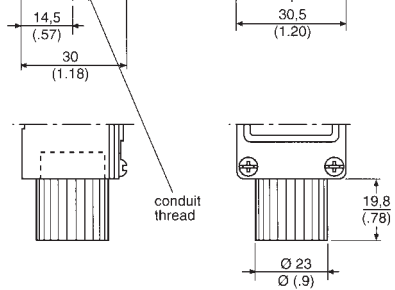
XX

(GLJ only)

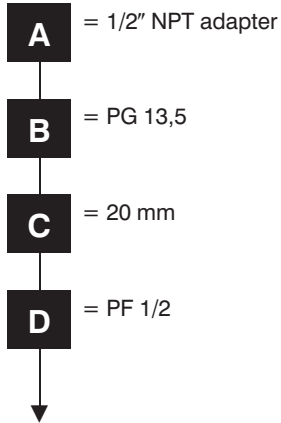
13

E7B

XXX



Conduit Thread

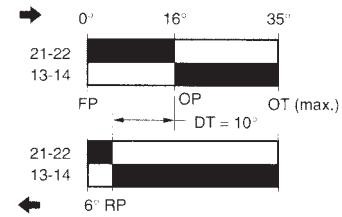
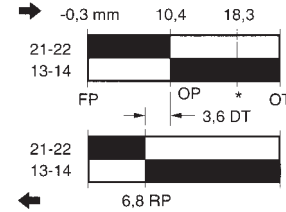


Ordering:

GLC

X

Example: GLC B 01 B



* Point from which the positive opening is assured.

01

| | | |
|--|--|--|
| | | |
| | | |

D

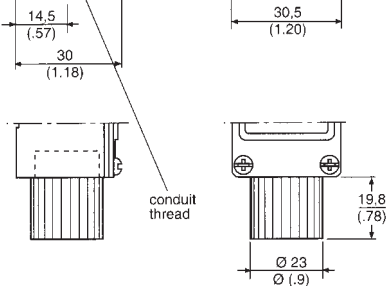
E7B

03

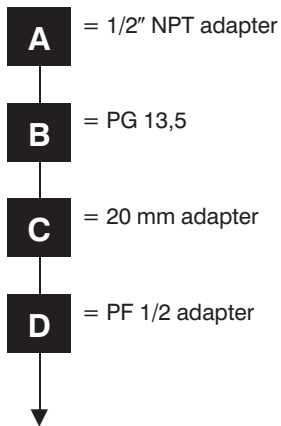
04

XX

XXX



Conduit Thread

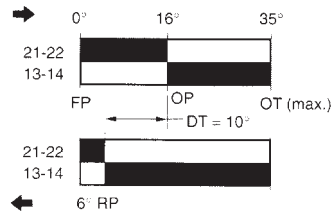
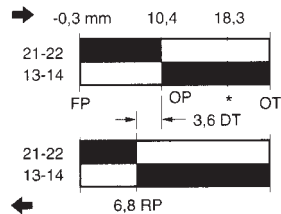


Ordering:

GLD

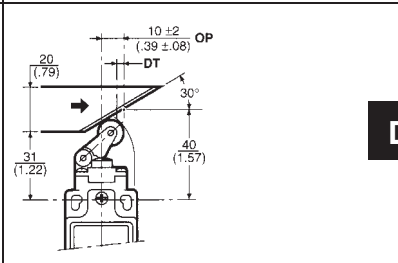
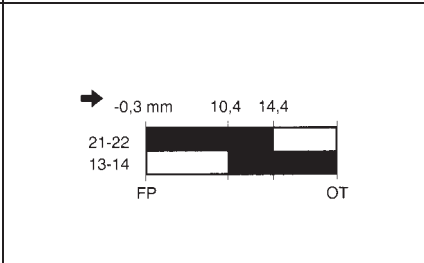
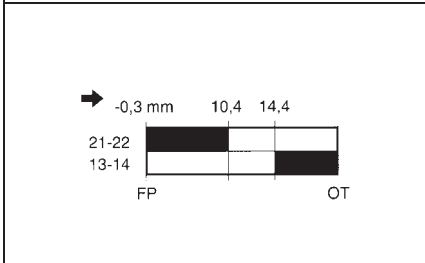
X

Example: GLD B 01 B

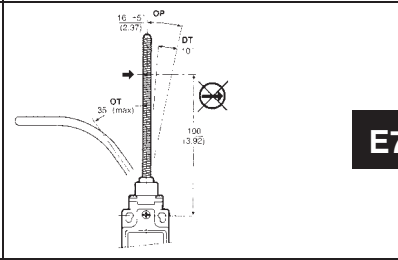
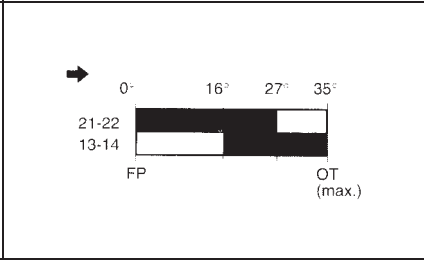
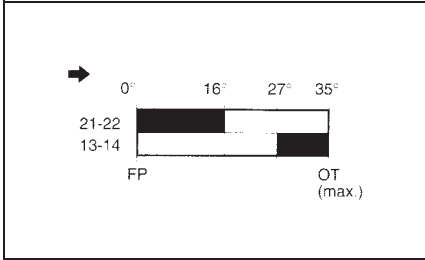


* Point from which the positive opening is assured.

01



D



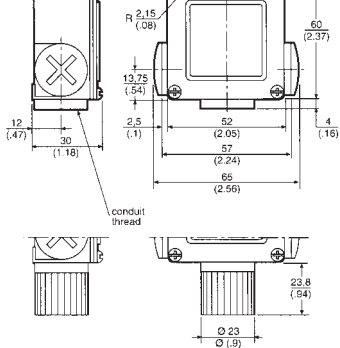
E7B

03

04

XX

XXX



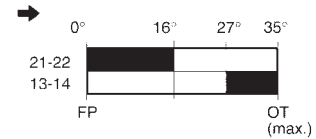
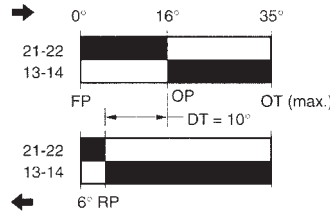
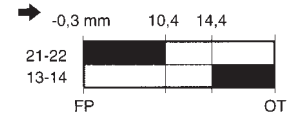
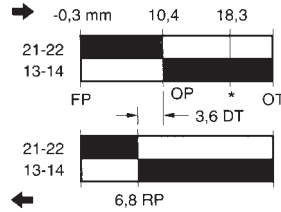
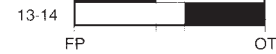
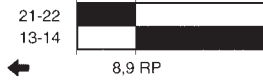
Conduit Thread

- A** = 1/2" NPT adapter
- B** = PG 13,5
- C** = 20 mm
- D** = PF 1/2

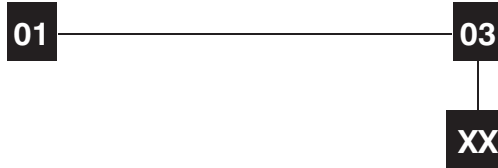
Ordering:

GLE **X**

Example: GLE B 01 B



* Point from which the positive opening is assured.



| | | | | |
|--|--|--|--|------------|
| | | | | D |
| | | | | E7B |

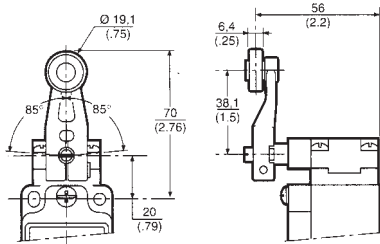
04

24

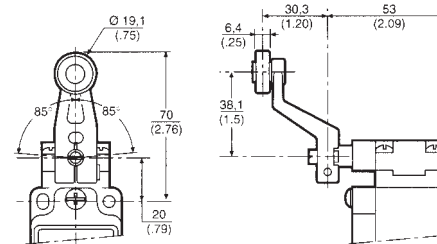
E7B

XXX

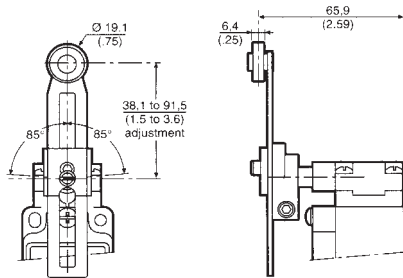
GLA, GLB, GLF, GLH, GLG, GLJ (EN 50041)



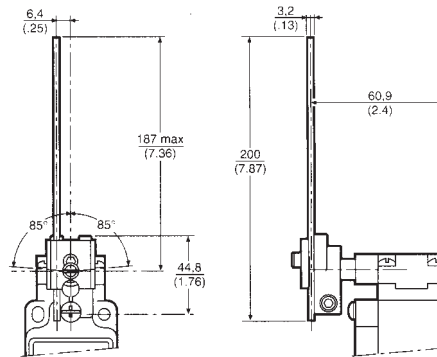
Side Rotary Roller Lever
A1A Plastic Roller
A1B Metal Roller



Offset Side Rotary Roller Lever
A5A – Plastic Roller
A5B – Metal Roller



Side Rotary Adjustable Lever
A2A Plastic Roller
A2B Metal Roller



Side Rotary Adjustable Rod
A4J Metal Rod Head

Figure 2

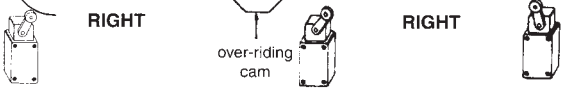
Heads

| Body Type | A | Head B | Types C | D | E7A | E7B | E7D | K8A | K8B | K8C |
|-----------|--------|--------|---------|--------|----------|----------|----------|----------|----------|----------|
| GLA | GLZ1AA | GLZ1AB | GLZ1AC | GLZ1AD | GLZ1AE7A | GLZ1AE7B | GLZ1AE7D | GLZ1AK8A | GLZ1AK8B | GLZ1AK8C |
| GLB | GLZ1AA | GLZ1AB | GLZ1AC | GLZ1AD | GLZ1AE7A | GLZ1AE7B | GLZ1AE7D | GLZ1AK8A | GLZ1AK8B | GLZ1AK8C |
| GLC | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | |
| GLD | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | |
| GLE | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | |
| GLF | GLZ1AA | GLZ1AB | GLZ1AC | GLZ1AD | GLZ1AE7A | GLZ1AE7B | GLZ1AE7D | GLZ1AK8A | GLZ1AK8B | GLZ1AK8C |
| GLG | GLZ1AA | GLZ1AB | GLZ1AC | GLZ1AD | GLZ1AE7A | GLZ1AE7B | GLZ1AE7D | GLZ1AK8A | GLZ1AK8B | GLZ1AK8C |
| GLH | GLZ1AA | GLZ1AB | GLZ1AC | GLZ1AD | GLZ1AE7A | GLZ1AE7B | GLZ1AE7D | GLZ1AK8A | GLZ1AK8B | GLZ1AK8C |
| GLJ | GLZ1AA | GLZ1AB | GLZ1AC | GLZ1AD | GLZ1AE7A | GLZ1AE7B | GLZ1AE7D | GLZ1AK8A | GLZ1AK8B | GLZ1AK8C |

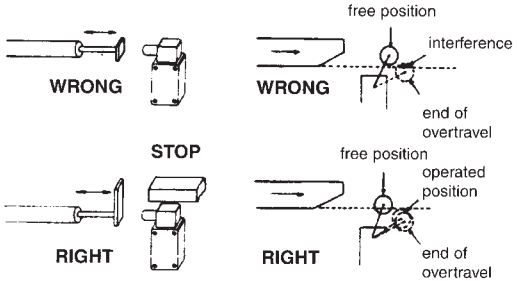
Levers / Actuators (For GLZ1AA Head Type Only (side rotary))

| Body Type | 1A | Lever 1B | Actuator 2A | Type 2B | 4J | 5B |
|-----------|--------|----------|-------------|---------|--------|--------|
| GLA | GLZ51A | GLZ51B | GLZ52A | GLZ52B | GLZ54J | GLZ55B |
| GLB | GLZ51A | GLZ51B | GLZ52A | GLZ52B | GLZ54J | GLZ55B |
| GLC | N/A | N/A | N/A | N/A | N/A | N/A |
| GLD | N/A | N/A | N/A | N/A | N/A | N/A |
| GLE | N/A | N/A | N/A | N/A | N/A | N/A |
| GLF | GLZ51A | GLZ51B | GLZ52A | GLZ52B | GLZ54J | GLZ55B |
| GLG | GLZ51A | GLZ51B | GLZ52A | GLZ52B | GLZ54J | GLZ55B |
| GLH | GLZ51A | GLZ51B | GLZ52A | GLZ52B | GLZ54J | GLZ55B |
| GLJ | GLZ51A | GLZ51B | GLZ52A | GLZ52B | GLZ54J | GLZ55B |

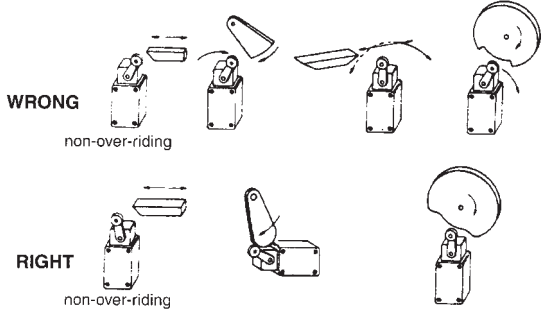
| | |
|-----------------------|--|
| GLZ312 | Snap Action SPDT 1 LED Plug-In (12) see Note 1 on page A25 |
| GLZ313 | Snap Action SPDT 2 LED Plug-In (13) see Note 1 on page A25 |
| GLZ320 | Snap Action DPDT (20) |
| GLZ324 | Snap Action DPDT for 3 Conduit (24) |
| Actuators | |
| GLZ51A | Side Rotary Fixed Lever Nylon Roller Actuator |
| GLZ51B | Side Rotary Fixed Lever Steel Roller Actuator |
| GLZ52A | Side Rotary Adjustable Lever Nylon Roller Actuator |
| GLZ52B | Side Rotary Adjustable Lever Steel Roller Actuator |
| GLZ54J | Side Rotary Adjustable Rod Actuator |
| GLZ55B | Side Rotary Fixed Offset Lever Steel Roller |
| LED Assemblies | |
| GLZ6F | Spare 1 LED Assembly for GLF... |
| GLZ6H | Spare 2 LED Assembly for GLH... |



Cam or dog arrangements should be such that the actuator is **not** suddenly released to snap back freely.



Operating mechanisms for limit switches should be so designed that, under any operating or emergency conditions, the limit switch is not operated beyond its overtravel limit position. A limit switch should not be used as a mechanical stop.

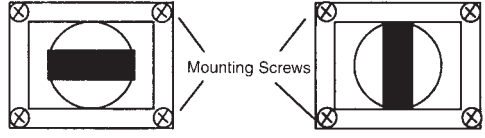


For limit switches with lever actuators, the actuating force should be applied as nearly perpendicular to the lever as practical and perpendicular to the shaft axis about which the lever rotates.

Mounting the switch in the upright position will enable maintenance and replacement procedures to be carried out easily.

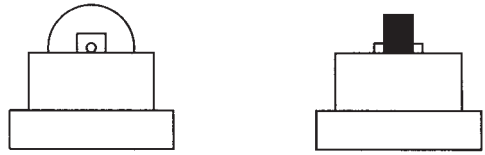
Adjustment and Set-up

In general no adjustment of the GLS should be necessary beyond correct mounting of the switch body as required. It is possible to change the switch actuator orientation. The example below shows a top roller plunger head rotated through 90°. The other head styles can also be rotated.



Top View of Roller Plunger

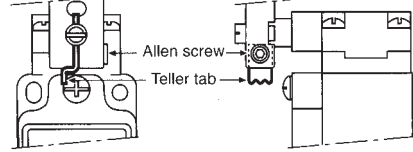
Top View of Roller Plunger Rotated 90°



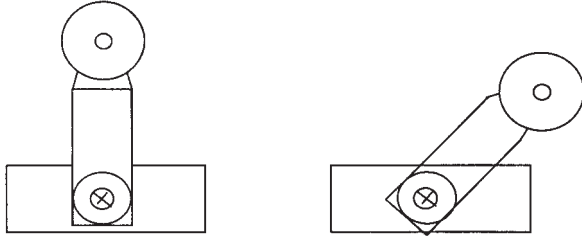
Front View of Roller Plunger

Front View of Roller Plunger Rotated 90°

The head can be rotated by carefully removing the four combination head screws holding the head in position. Carefully remove the head assembly and rotate to the desired position. Replace the head assembly and tighten the mounting screws. Ensure that the head is properly located. Hand test the actuator to ensure that the switch functions and the actuator moves freely (sticking can occur if material has been deposited inside the drive train whilst the head assembly was removed).



Miniature EN 50047 body style



Side Rotary Standard Free Position

Side Rotary with Customised Free Position

A serrated coupling is used to set the lever free position in 10° increments. This adjustment is achieved by: (1) Unscrewing the combination head screw which holds the lever in place, taking care not to lose any parts; (2) Readjust the assembly and rotate to the desired free position; (3) Re-assemble and tighten the combination screw. (4) Check that the free position is correct for the application and repeat the adjustment procedure if necessary.

NOTE: The lever can be set in 90° increments by removing the lever and rotating it to the desired 90° position.

Heads

All EN 50041 style switch heads can be removed and replaced.

Remove the old head by unscrewing the four retaining screws on the head assembly.

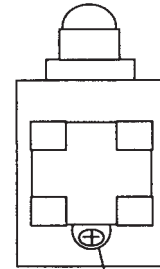
Ensure replacement part is identical to one being removed.

Re-test the assembly and ensure correct operation.

Basics

Non plug-in EN 50041 and three conduit EN 50047 body styles.

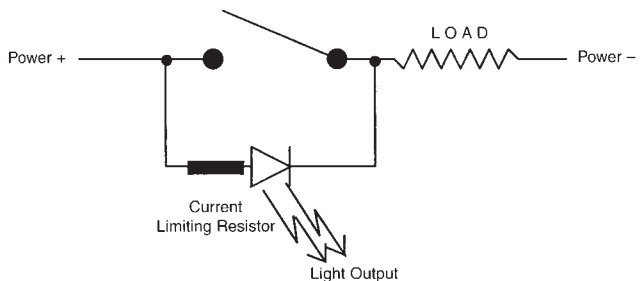
Basic switches can be removed and replaced by following this procedure: (1) Remove the cover from the body; (2) Before disconnecting the switch wiring, carefully note the wiring arrangement for your application, particularly the safety ground connection; (3) Remove the basic switch retaining screw; (4) Remove the old basic and replace it with the same thing; (5) Use the retaining screw to install the new basic – ensure that it is correctly seated in the switch body; (6) Wire the switch terminals as before; (7) Before replacing the cover – ensure that the switch wires are not twisted or otherwise lifted from the basic (to prevent them from becoming trapped when the cover is replaced); then (8) Test the switch in the application.



Retaining Screw for Basic

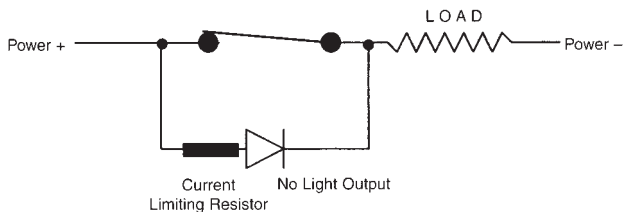
that can be used for the LED's. Combinations of these arrangements can be used where the dual LED versions of GLS are employed.

Typical Wiring Arrangement 1



In "Wiring Arrangement 1" you can see that while the main basic is open the current for the LED can flow through the LED (via the load) and the LED illuminates.

Typical Wiring Arrangement 2



In "Wiring Arrangement 2" you can see that while the main switch is closed the current for the LED cannot flow through the LED and the LED will not illuminate.

While every effort is made to ensure that the above guidelines are accurate, no responsibility can be accepted for failure to apply good engineering practice to machinery design and use of Honeywell products. Never apply any of the procedures outlined above on live circuits. Ensure that testing of changes is carried out with no risk of injury during tests. These guidelines are produced to help our customers make the right choices in applying our Limit Switches to general applications. Contact your local Honeywell representative if you have any difficulties.

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