

1.4. Rotary Cam Switch SWV100

LEONARD rotary cam switches SWV100 (see figure 1.4.1) are cased in housings made of cast aluminum. Their construction is unique and they are fitted out with electronic or mechanic switching elements. The technical data of all available switching elements are listed in figure 1.0.1 and 1.0.4. The rotary cam switches SWV100 could be supplied with direct drive or with a gearbox. They were built as a safety rotary cam limit switch, as a combined rotary cam switch with an encoder or as a protective housing for two encoders.

All rotary cam switches SWV100 dispose of one driving spindle and two cam shafts. They are normally supplied with 4 mechanic or 6 electronic switching elements on each of both cam shafts. It is also possible to lengthen the cover by a intermediate frame, so that more switching elements can be installed as normal.

Each of both cam shafts of the rotary cam switch SWV100 can be driven directly or by a gearbox. The power transmission from the driving spindle to the cam shafts is done by helical gears. The figure 1.4.2 explains the construction on principle.

The driving spindle and the two cam shafts are mounted in deep groove ball bearings and maintenance-free. The driving spindle comes out on both sides of the housing of the switch. The second end of the spindle, which is normally unused, is protected by a safety cover. The transparent safety cover has some index marks for the scale ring underneath.

Either the cam shaft is fitted with cam disk sets to actuate the individual mechanic switching elements or the cam shaft is fitted with switch drums to actuate the individual electronic switching elements. The new design of these switch drums consist of plastic drums incorporating a thin steel foil which can be extended or retracted to any extent required.

The infinitely adjustable cam disk sets resp. switch drums are individually tensioned by disc springs. This tension is such that all cam disk sets resp. switch drums can be adjusted when the clamp nut is slackened. After setting all the cam disk sets resp. switch drums the complete adjustment can be checked on start up for trial operation. Only after all switching adjustments have been tested, the clamp nut is tightened against the disc spring. All cam disk sets resp. switch drums are positively located in the position set.

Each cam disk set consists of the components listed in figure 1.4.3.a. The cam rings and graduated disks have a diameter of 100 mm and a scale of 360° with a graduation of 2°, though a high and precise switching angle resolution is provided. The accurate adjustment of the switching points is guaranteed, because the cam rings have a switch-on and switch-off point index mark. The cam rings as well as the graduated disks are made of die-cast aluminum. Thus reduces the inertia forces and increases the life of the deep groove ball bearings. Based on the surface protection of the cam rings and the graduated disks, they are "hard coated", a maximum of surface hardness, a maximum of corrosion protection and a maximum of resistance to seawater and many chemical substances is guaranteed.

Each switch drum consists of the components listed in figure 1.4.3.b. The steel foil in the switching foil drum and the carrier disk have an angular scale from 5° up to 360° with 2° graduation. By means of these two on the same level, directly adjacent scales it is possible to set the pulse beginning and the pulse duration



Fig. 1.4.1:
Rotary Switch SWV100-04 EGA400.5 G1 10:1
without Cover

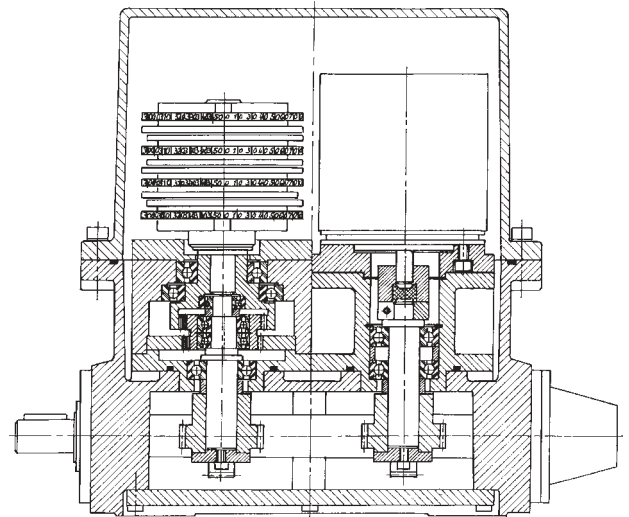


Fig. 1.4.2:
Rotary Cam Switch SWV100-04 MNS G1 624:1

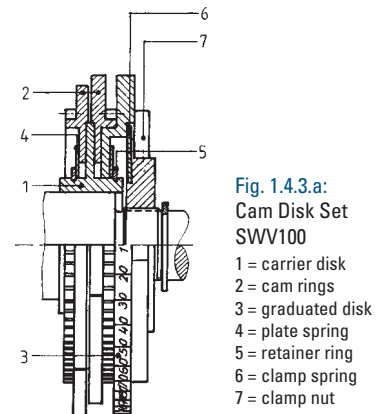


Fig. 1.4.3.a:
Cam Disk Set
SWV100

- 1 = carrier disk
- 2 = cam rings
- 3 = graduated disk
- 4 = plate spring
- 5 = retainer ring
- 6 = clamp spring
- 7 = clamp nut

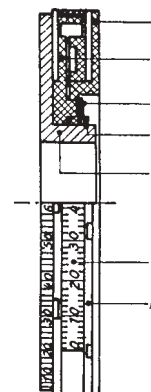


Fig. 1.4.3.b:
Switch Drum
SWV100

- 1 = carrier disk
- 2 = switching foil drum
- 3 = cover
- 4 = switching foil setting ring
- 5 = steel foil
- 6 = disc spring
- 7 = retainer ring

keeping one adjustment tool and turning the second adjustment tool clockwise or anticlockwise the steel foil will be extended out of the drum or retracted back into the drum until the required pulse length is obtained. Subsequently the pulse beginning is carried out the same way: The first adjustment tool is inserted in one of the six slots of the switching foil drum and the second adjustment tool is inserted in the compression spring. By turning clockwise or anticlockwise the beginning of the steel foil in the switching foil drum is set to the required angle, which is read off on the directly adjacent carrier disk. The unique construction of our switch drums guarantee a quick and easy modification of the pulse duration at any time. For that purpose the adjustment tool must only be inserted in the switch drum and turn clockwise or anticlockwise.

The rotary cam switches fitted with mechanic switching elements have switching element actuators, which parts are of zinc die-casting and surface treated or of acid-resisting stainless steel. The roller is produced from wear-resistant plastic and is self lubricating. The switches dispose of ideal anti-friction properties. Therefore the wear of the rollers in the roller levers is reduced to a minimum.

The rotary cam switches fitted with electronic switching elements have contact holders made of plastic.

If the LEONARD rotary cam switch SWV100 is built as a protective housing, the encoder can be connected by a strip terminal. The encoder is joined to the cam shaft (encoder shaft) by a coupling RK14. The flange, on which the encoder will be fitted, is manufactured according to the dimensioned drawing of the encoder.

The housing of the rotary cam switch is made of aluminum alloy and painted in RAL6011. Optional the switch can be supplied in a seawaterproof performance. All housings have two cable entries M32. The top section of the housing is connected to the bottom section by 4 eternally fixed screws. All screws are of stainless steel. The rotary cam switch could be mounted with 4 screws M8. Please have a look at all dimensions in figure 1.4.5. The weight varies between 20 and 30 kg depending on the performance of the rotary cam switch.

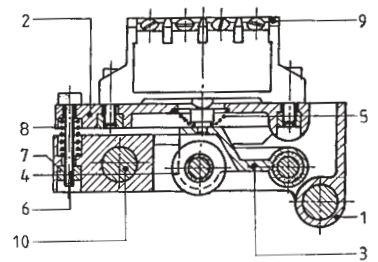


Fig. 1.4.4.a:
Switching Element Actuator SWV100
1 = bracket 6 = adjusting screw
2 = contact holder 7 = self-locking nut
3 = roller lever 8 = compression spring
4 = roller 9 = switching element
5 = return spring 10 = holding bolt

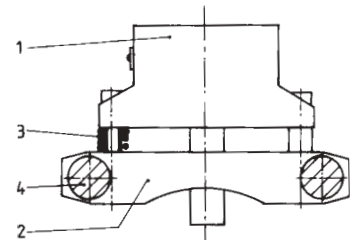


Fig. 1.4.4.b:
Contact Strip with Switching Element SWV100
1 = switching element 3 = compression spring
2 = contact holder 4 = holding bolt

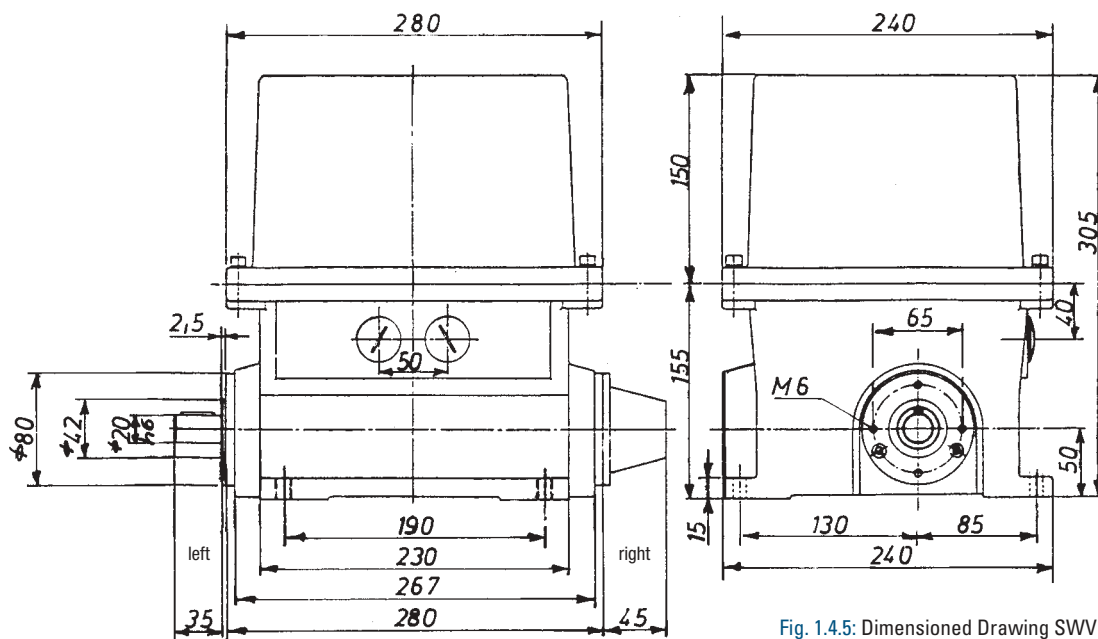


Fig. 1.4.5: Dimensioned Drawing SWV100

The two in the rotary cam switch integrated gearboxes for the cam shaft resp. encoder shaft could be chosen independently. The gearboxes have a life lubrication. They are maintenance free. The normally ratios of our gearboxes are as follows:

| | | | | | | | |
|------|-----|------|-------|-------|--------|--------|--------|
| 1:10 | 2:1 | 10:1 | 35:1 | 175:1 | 504:1 | 1500:1 | 7020:1 |
| 1:8 | 3:1 | 12:1 | 45:1 | 200:1 | 560:1 | 2024:1 | |
| 1:6 | 4:1 | 15:1 | 54:1 | 248:1 | 624:1 | 2414:1 | |
| 1:5 | 5:1 | 16:1 | 75:1 | 300:1 | 740:1 | 3024:1 | |
| 1:4 | 6:1 | 18:1 | 100:1 | 352:1 | 900:1 | 3509:1 | |
| 1:3 | 7:1 | 20:1 | 125:1 | 400:1 | 1000:1 | 4004:1 | |
| 1:2 | 8:1 | 25:1 | 154:1 | 430:1 | 1225:1 | 5564:1 | |

Other ratios on request.

Ordering instructions for type SWV100:

| type | left side | | | | right side | | | |
|------|------------------------------|----------------------------|------------|-------|------------------------------|----------------------------|------------|-------|
| | number of switching elements | type of switching elements | gearbox G1 | ratio | number of switching elements | type of switching elements | gearbox G2 | ratio |
| *0) | *1) | *1) | *2) | *2) | *1) | *1) | *2) | *2) |

Product overview:

| | | | | | | | | |
|---------|----|----------|----------------|----------------|----|----------|----------------|----------------|
| SWV100- | 03 | MNS | [no statement] | [no statement] | 03 | MNS | [no statement] | [no statement] |
| | 04 | RD | | | 04 | RD | | |
| | 05 | EGA400.5 | G1 | see above | 05 | EGA400.5 | G2 | see above |
| | 06 | | | | 06 | | | |

Example (safety rotary cam limit switch, combined rotary cam switch, protecting house):

| |
|--|
| SWV100-04 EGA400.5 G1 75:1 - 06 EGA400.5 G2 1000:1 |
| SWV100-04 MNS G1 3024:1 |
| SWV100 G1 75:1 - G2 8000:1 |

*0) The type SWV100M is a special design with electronic switching elements and metal cam disk sets!

*1) We don't need this information, if the side of the switch is used as a protective housing for an encoder. In that case we need the type and a dimensioned drawing of the encoder!

*2) We don't need this information for direct drive!

If you need a rotary cam switch in a special design, please give a precise description "in plain text"!