

**Radial cams, T-slot cam semicircles/T-slot cam drums**  
Catalogue N-TR/12





**Caution!**

The devices presented in this range are not intended for private consumers, i.e. they are not consumer products within the meaning of the European Directives (in Germany within the meaning of Section 5 GPSG) or other national laws. Assembly and commissioning of the devices requires personnel with the appropriate basic electrotechnical training or require personnel who have been initiated accordingly.

Subject to technical modifications and errors. The data specified in this catalogue are carefully checked typical standard values.

Descriptions of technical correlations, details on external control units, installation and operating instructions or similar have been provided to the best of our knowledge. However, this does not mean that warranted characteristics or other properties under liability law may be assumed which extend beyond the "General Terms of Delivery of Products and Services of the Electrical Industry".

We trust you will understand that the user must therefore check our information and recommendations before using our equipment.

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# Radial cams, T-slot cam semicircles, T-slot cam drums

## General

Selected logically arranged and task-specific cams, fastened in T-slot sections, give defined control signals in programmed form to a multi-position switch or similar. This type of control system operates without code and without encrypted data and is clear for the operator to understand. In addition, tolerances which arise due to tool wear, material tolerances and temperature fluctuations etc. may be directly counterbalanced.

It is frequently easier and more economical to solve positioning tasks in mechanical engineering, machine tool and plant construction in this way than by using NC and CNC technology or by using several individual position switches. A range of useful electromechanical and electronic combination possibilities is likewise available.

In addition to the multi-position switch, cams and fastening slots represent essential components of the electromechanical control system. In this respect our range covers the most diverse tasks:

- For lengthwise movements: cams and T-slot trip dogs according to catalogue N-NT/12
- For rotational movements: radial cams, T-slot cam semicircles and T-slot cam drums according to catalogue N-TR/12
- For signalling: multi-position switch with electromechanical mode of operation according to catalogue RP/12

Special design features also satisfy enhanced requirements of accuracy, flexibility and operational reliability.

# T-slot cam semicircles, T-slot cam drums

## Design features

### Position control system using cam drums

In the course of the growing significance of positioning tasks, applications which fall below the viability threshold for NC and CNC technology increasingly arise for the cam semicircles, cam drums and radial cams presented in this catalogue. Examples of application areas include rotational movements with rotary tables and rotary indexing tables, industrial robots and operational robots, and turning and swivelling devices of all kind. The cam control system via semicircles and drums also offers the advantage of being able to perform control processes outside areas containing dirt, coolant or filings etc.

### Dimensions and mechanical construction

Derived from DIN 69 638 "Slot sections and slot divisions, Form B", cam semicircles and cam drums are offered with 12 or 16 mm slot spacing in a T-section by way of standard (see page 22 for 8 mm slot spacing).



The external slot pegs are dimensioned such that they correspond to half a peg and can be lined up in combination. The slot spacing of 12 mm or 16 mm is still assured as long as no more than 3 sections are arranged in line.

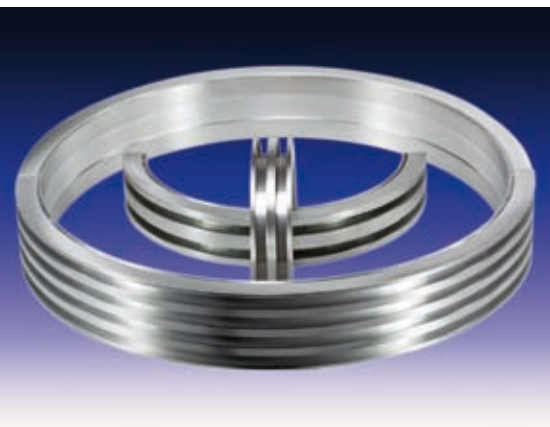
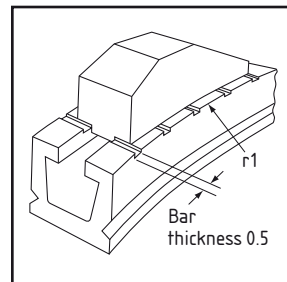
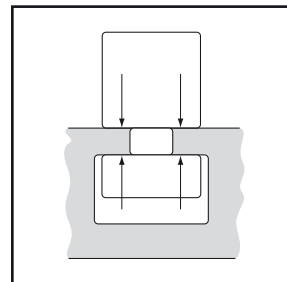
Cam drums are supplied both according to customer drawing and within the framework of the standard delivery range. The following general remarks apply exclusively to catalogue devices.

Versions offered here have outer diameters ranging from 80 to 320 mm with up to 12 slots. The standard fixing hole is 20 H 7. All versions of cam drums are turned from solid metal.

### Clamping in the T-section

The T-slot clamping effects non-positive two-surface press fit and ensures that the cam is held with the best possible retention force. Moreover, the even distribution of the clamping forces provides long-term stability of the cam positioning without risk of deformation, even when activated frequently or quickly.

The clamping ensures that the cam is automatically held at a constant height in the T section, which facilitates the accurate adjustment and presetting of the cam programs.



The cam semicircles are bent from extruded aluminium from an Al Mg Si 05 alloy with 1, 2 and 4 rows in different radii. Fixing takes place using M 4 x 8 hexagon socket screws to DIN 912, which are introduced from the front of the slot section. Countersinking is necessary in order to facilitate the unobstructed sliding of the cam over the screw heads. Cam semicircles with corresponding fixing holes are available as an option.

## Radial cams

### Design features

Radial cams are bent to suit the profile radius from drawn steel profiles. Available cam height options are 12.5 mm, 14 mm and 16 mm.

The surface of the cam bodies are protected against corrosion, mechanically actuated steel cams are additionally hardened (approx. 60 HRC).

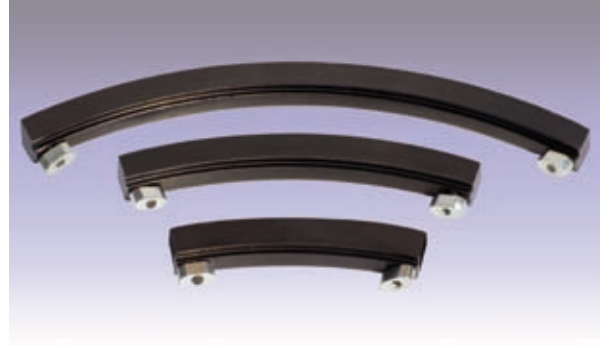
The metal slot bolts are manufactured and dimensioned such that extensive press fitting results in the T-sections. M 4 hexagon socket screws are used for fastening.

Radial cams are supplied for non-contact signaling (proximity cams) or for mechanical actuation with an approach angle of  $26^{\circ} 34'$  to DIN 69639. This corresponds to an incline of the approach angle of the cam in the ratio 1:2 (2 mm sliding of the cam = 1 mm slide stroke on the position switch).

The radial cams adjusted to the diameters of the cam semicircles and cam drums may be deployed for 12 mm and 16 mm slot spacing. The standard delivery version supplies cams for insertion from above. The following process ensures secure positioning:

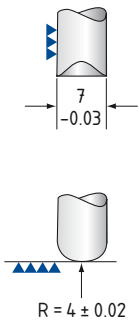
- Loosen the slot bolt
- Insert cams
- Tighten fastening screw evenly (please ensure when doing so that the rotational direction of the screw is maintained without moving in the opposite direction!)

Cams for lateral fastening in cam semicircles and cam drums with insertion opening are similarly available (additional shape designation ...3).



## Radial cams

### Wear of cams and switch plungers – general



The pairing of cam/switch plunger can lead to very different signs of wear, for example to complete wearing out after fewer than 5,000 actuations or to practically no wear after more than **10,000,000 switch actuations**.

The switch actuation using cams takes place in bursts which, in the event of an unfavourable configuration of both parts, can lead to more rapid damage occurring to either the plunger or cams.

Based on operating experience and trials over several years, Elan offers **high stability of the switching point** through

- **limit switch plunger** made from rust-resistant steel with rounded plunger top, hardened and bevelled, fine polished, and actuated by shock absorbing
- **plastic cams** made from abrasion-resistant plastic. With this low-priced pair of steel/plastic materials, no abrasion can be measured after **30 million actuations** on the starting area where switching takes place.

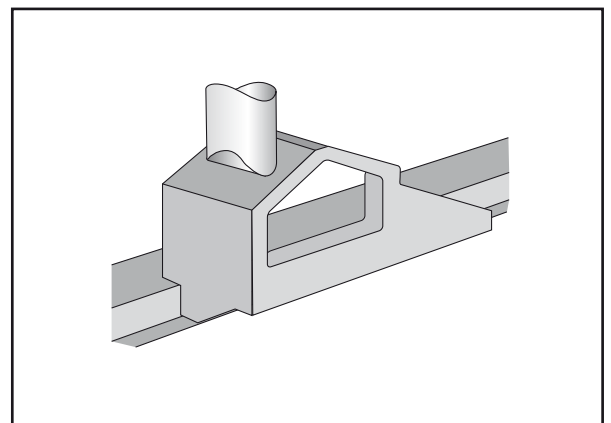
The configuration of the plunger top plays a significant role in wear and tear. Chisel plungers that have sharp edges and are burred have a chiselling effect and can damage both plastic cams and steel cams.

The sharp top edge of the plunger can similarly be considerably worn by plastic and steel cams, thereby quickly shifting the switching point.

High stability of the switching point is, however, a prerequisite for all series production. We therefore recommend when pairing with chisel plungers that the sharp edges of the plunger are rounded off by lightly polishing.

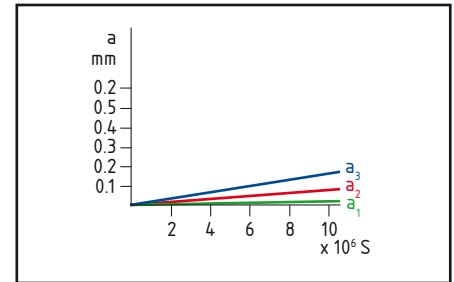
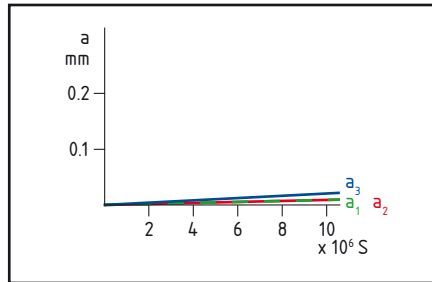
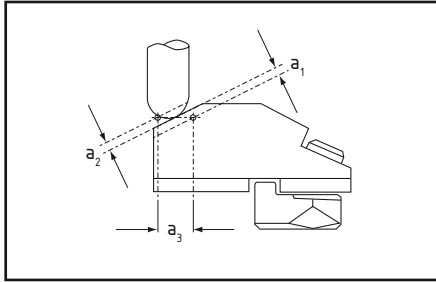
The plungers in the limit switches have no sharp edges on the top, but have polished rounded grinding (cylindrical grinding) with a radius of 4 mm to DIN 43697 and a tolerance of  $\pm 0.02$  mm. Furthermore, the distortion tolerance of the plunger enables the plunger/cam contact point to represent a line at all times. This plunger top design thereby guarantees the lowest wear to cam and plunger.

In the case of steel cams, lubrication is important and prevents possible chafing of the cam. Lubrication is not necessary in the case of plastic cams, but is nevertheless recommended once during commissioning. Lubrication of the cam plunger top using established lubricants fundamentally significantly increases service life.



## Radial cams

### Wear of cams and switch plungers – test results



#### Conditions

- Actuations: 10,000,000
- Starting speed: 24 m/min
- Actuating force of the plunger: 2.5 kp
- Lubrication: once during commissioning

#### Key

- $a_1$  = Wear to the cam
- $a_2$  = Wear to the plunger
- $a_3$  = Shifting of the switching point

#### steel plunger/plastic cams

- Cams: slightly rounded at the tip.  
Resultant height loss 0.2 mm.  
No wear to approach angle.

#### Test result

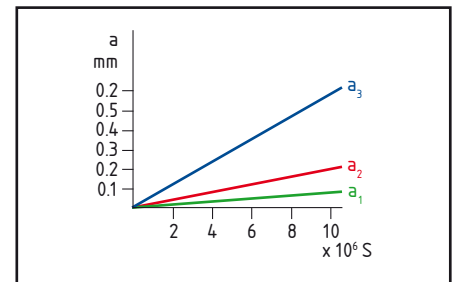
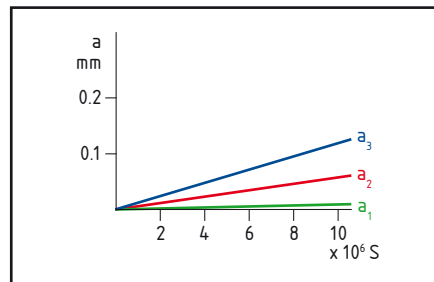
- $a_1 = <0.01$
- $a_2 = <0.01$
- $a_3 = <0.03$

#### steel plunger/steel cam

- Cam: slightly rounded at the tip.  
Resultant height loss 0.15 mm.  
No wear to approach angle.

#### Test result

- $a_1 = <0.01$
- $a_2 = \sim 0.06$
- $a_3 = <0.12$



#### Sharp-edged chisel plunger/plastic cam

- Cam: heavily rounded at the tip.  
Height loss 0.35 mm.
- Plunger: chisel tip rounded.

#### Test result

- $a_1 = \sim 0.01$
- $a_2 = 0.06$
- $a_3 = >0.16$

#### Sharp-edged chisel plunger/steel cam

- Cam: highly polished and slightly rounded.
- Plunger: chisel tip flattened.

#### Test result

- $a_1 = 0.08$
- $a_2 = 0.20$
- $a_3 = 0.56$

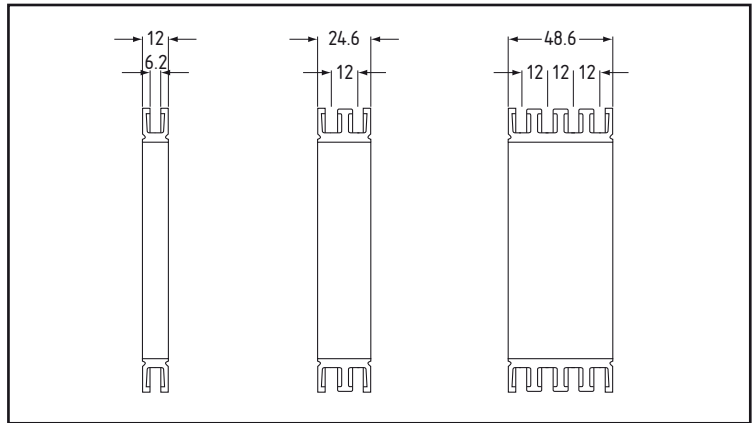
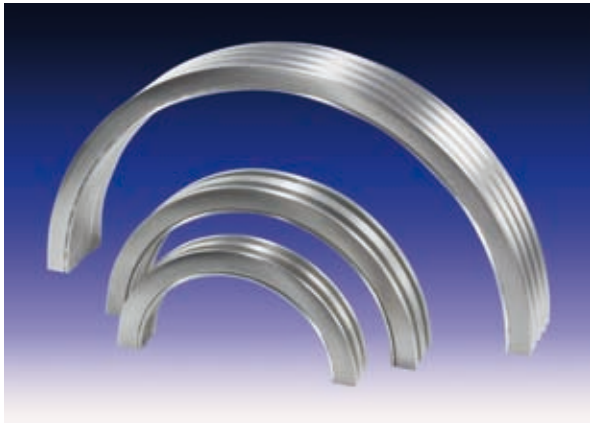
#### Summary

The least wear and therefore the longest service life results from application of the rounded Elan steel plunger with the Elan plastic cam. Even greater values are achieved by lubricating with established lubricants.



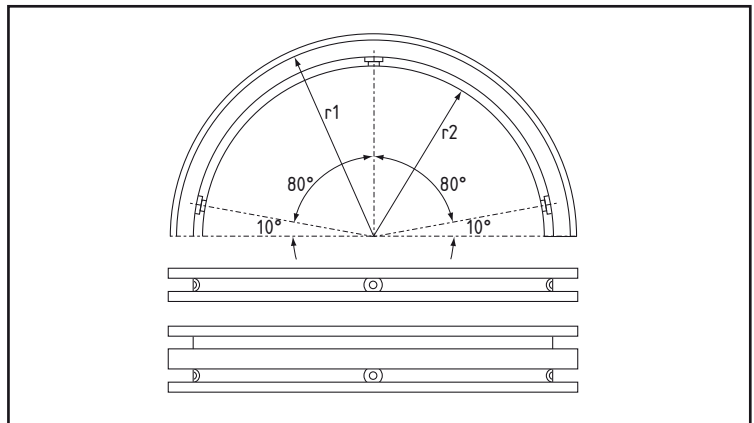
# Al cam semicircles

## 12 mm slot spacing



Dimensions

Tolerance of the radii	
$r_1$ (mm)	$r_2$ (mm)
$75 \pm 2$	$59 \pm 2$
$100 \pm 2$	$84 \pm 2$
$125 \pm 2$	$109 \pm 2$
$160 \pm 3$	$144 \pm 3$
$250 \pm 3$	$234 \pm 3$

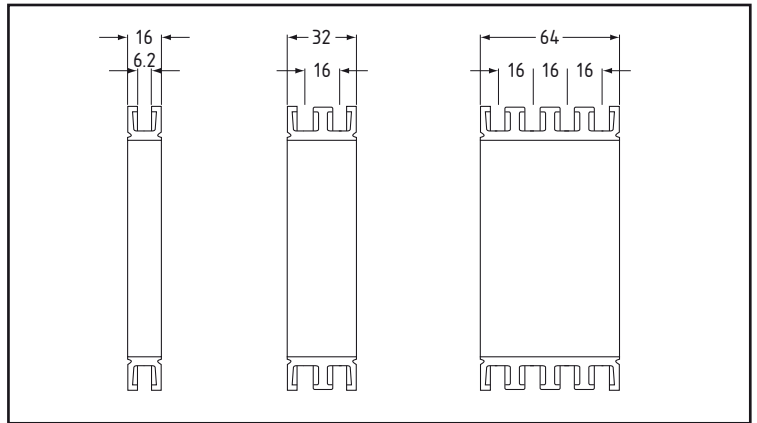
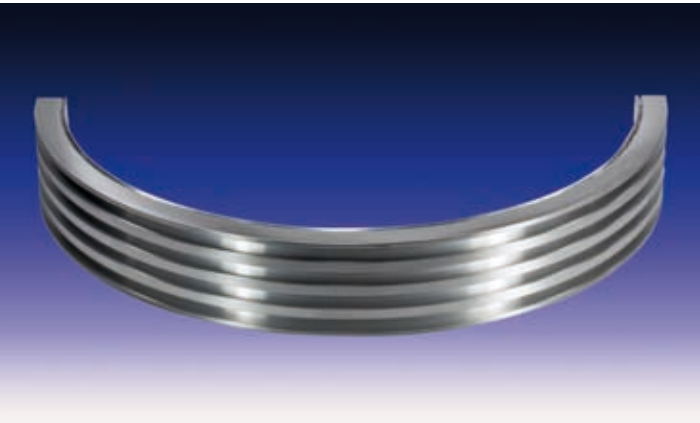


Arrangement of the fixing drill holes

Number of slots	External nominal radius $r_1$	Basic configuration			with drill hole		
		Form	Catalogue no.	Order no.	Form	Catalogue no.	Order no.
1	75	NLAH 12.1/ 75	207 0001	100 3302	NLAH 12.1/ 75B	207 0411	101 1519
	100	NLAH 12.1/100	207 0103	100 3303	NLAH 12.1/100B	207 0600	101 1520
	125	NLAH 12.1/125	207 0201	100 3304	NLAH 12.1/125B	207 0707	101 1521
	160	NLAH 12.1/160	207 0308	100 3305	NLAH 12.1/160B	207 0804	101 1522
	250	NLAH 12.1/250	207 0405	100 3306	NLAH 12.1/250B	207 0901	101 1526
2	75	NLAH 12.2/ 75	207 0911	100 3292	NLAH 12.2/ 75B	207 1500	101 1531
	100	NLAH 12.2/100	207 1100	100 3293	NLAH 12.2/100B	207 1606	101 1532
	125	NLAH 12.2/125	207 1207	100 3294	NLAH 12.2/125B	207 1703	101 1533
	160	NLAH 12.2/160	207 1304	100 3295	NLAH 12.2/160B	207 1801	101 1535
	250	NLAH 12.2/250	207 1401	100 3296	NLAH 12.2/250B	207 1908	101 1539
3	75	NLAH 12.4/ 75	207 2011	100 3282	NLAH 12.4/ 75B	207 2111	101 1543
	100	NLAH 12.4/100	207 2022	100 3283	NLAH 12.4/100B	207 2122	101 1544
	125	NLAH 12.4/125	207 2033	100 3284	NLAH 12.4/125B	207 2133	101 1545
	160	NLAH 12.4/160	207 2044	100 3285	NLAH 12.4/160B	207 2144	101 1547
	250	NLAH 12.4/250	207 2055	100 3286	NLAH 12.4/250B	207 2155	101 1548

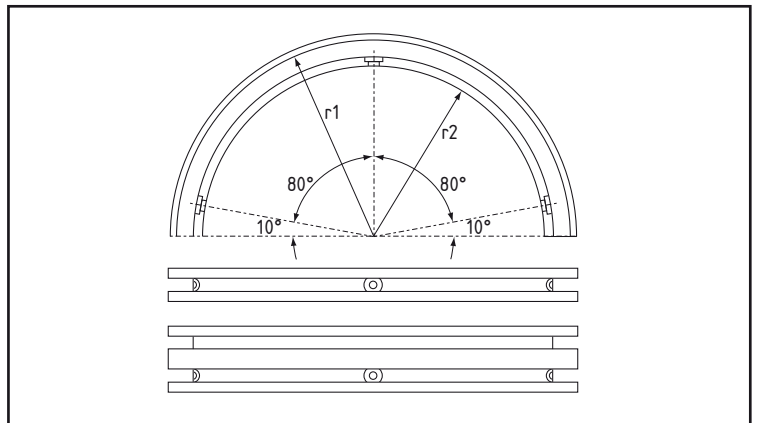
Other radii, cam numbers and configurations: upon request.

# Al cam semicircles 16 mm slot spacing



Dimensions

Tolerance of the radii	
$r_1$ (mm)	$r_2$ (mm)
$75 \pm 2$	$59 \pm 2$
$100 \pm 2$	$84 \pm 2$
$125 \pm 2$	$109 \pm 2$
$160 \pm 3$	$144 \pm 3$
$250 \pm 3$	$234 \pm 3$



Arrangement of the fixing drill holes

Number of slots	External nominal radius $r_1$	Basic configuration			with drill hole		
		Form	Catalogue no.	Order no.	Form	Catalogue no.	Order no.
1	75	NLAH 16.1/ 75	207 4100	1003277	NLAH 16.1/ 75B	207 4600	101 1557
	100	NLAH 16.1/100	207 4109	1003278	NLAH 16.1/100B	207 4605	101 1558
	125	NLAH 16.1/125	207 4206	1003279	NLAH 16.1/125B	207 4702	101 1559
	160	NLAH 16.1/160	207 4303	1003280	NLAH 16.1/160B	207 4800	101 1560
	250	NLAH 16.1/250	207 4401	1003281	NLAH 16.1/250B	207 4907	101 1561
2	75	NLAH 16.2/ 75	207 5100	1003272	NLAH 16.2/ 75B	207 5500	101 1562
	100	NLAH 16.2/100	207 5105	1003273	NLAH 16.2/100B	207 5601	101 1563
	125	NLAH 16.2/125	207 5202	1003274	NLAH 16.2/125B	207 5709	101 1564
	160	NLAH 16.2/160	207 5300	1003275	NLAH 16.2/160B	207 5806	101 1565
	250	NLAH 16.2/250	207 5407	1003276	NLAH 16.2/250B	207 5903	101 1566
3	75	NLAH 16.4/ 75	207 6011	1003266	NLAH 16.4/ 75B	207 6111	101 1568
	100	NLAH 16.4/100	207 6022	1003267	NLAH 16.4/100B	207 6122	101 1569
	125	NLAH 16.4/125	207 6033	1003268	NLAH 16.4/125B	207 6133	101 1570
	160	NLAH 16.4/160	207 6044	1003269	NLAH 16.4/160B	207 6144	101 1571
	250	NLAH 16.4/250	207 6055	1003270	NLAH 16.4/250B	207 6155	101 1572

Other radii, cam numbers and configurations: upon request.

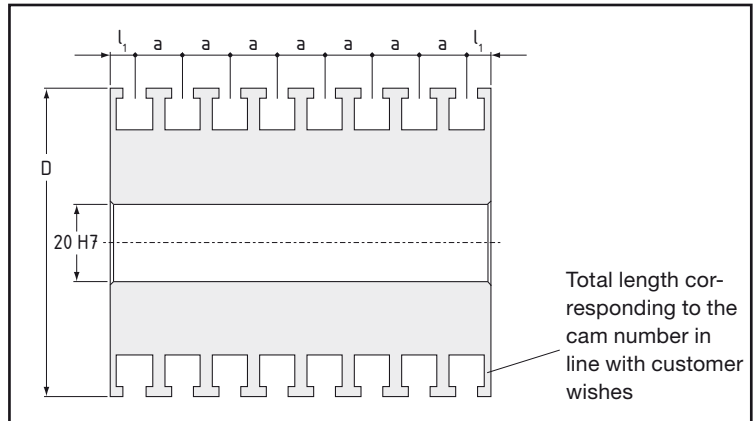
# Al cam drums

## 12 and 16 mm slot spacing

### Version A



The illustrated cams do not form part of the cam drum scope of delivery and must be ordered separately.



Dimensions version A

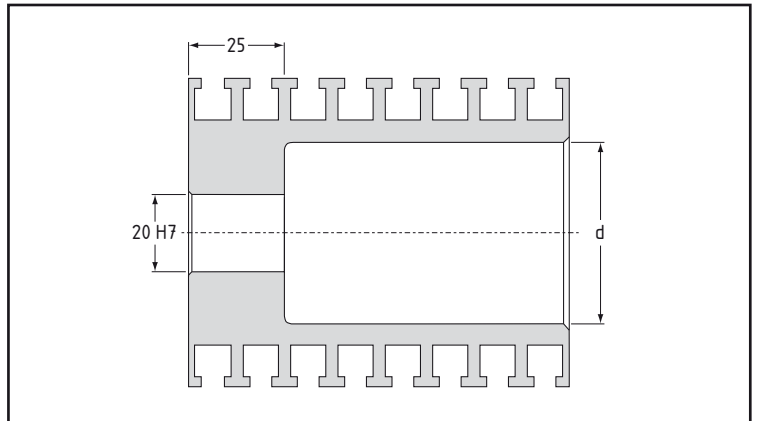
Version	Outer Ø D (mm)	Inner Ø d (mm, ap- prox. values)	Slot spacing 12 mm			Slot spacing 16 mm		
			Form	Catalogue no.	Order no.	Form	Catalogue no.	Order no.
A	80		NTRN 12.1/80A	2080001	101 1601	NTRN 16.1/80A	208 1001	101 1701
			NTRN 12.2/80A	2080002	101 1602	NTRN 16.2/80A	208 1002	101 1702
			NTRN 12.3/80A	2080003	101 1603	NTRN 16.3/80A	208 1003	101 1703
			NTRN 12.4/80A	2080004	101 1604	NTRN 16.4/80A	208 1004	101 1704
			NTRN 12.5/80A	2080005	101 1605	NTRN 16.5/80A	208 1005	101 1705
			NTRN 12.6/80A	2080006	101 1606	NTRN 16.6/80A	208 1006	101 1706
			NTRN 12.7/80A	2080007	101 1607	NTRN 16.7/80A	208 1007	101 1707
			NTRN 12.8/80A	2080008	101 1608	NTRN 16.8/80A	208 1008	101 1708
			NTRN 12.9/80A	2080009	101 1609	NTRN 16.9/80A	208 1009	101 1709
			NTRN 12.10/80A	2080010	101 1610	NTRN 16.10/80A	208 1010	101 1710
			NTRN 12.11/80A	2080011	101 1611	NTRN 16.11/80A	208 1011	101 1711
			NTRN 12.12/80A	2080012	101 1612	NTRN 16.12/80A	208 1012	101 1712
A	100		NTRN 12.1/100A	2080021	101 1615	NTRN 16.1/100A	208 1021	101 1713
			NTRN 12.2/100A	2080022	101 1616	NTRN 16.2/100A	208 1022	101 1714
			NTRN 12.3/100A	2080033	101 1617	NTRN 16.3/100A	208 1033	101 1715
			NTRN 12.4/100A	2080044	101 1618	NTRN 16.4/100A	208 1044	101 1716
			NTRN 12.5/100A	2080055	101 1619	NTRN 16.5/100A	208 1055	101 1717
			NTRN 12.6/100A	2080066	101 1622	NTRN 16.6/100A	208 1066	101 1718
			NTRN 12.7/100A	2080070	101 1623	NTRN 16.7/100A	208 1070	101 1719
			NTRN 12.8/100A	2080072	101 1624	NTRN 16.8/100A	208 1077	101 1720
			NTRN 12.9/100A	2080074	101 1625	NTRN 16.9/100A	208 1090	101 1721
			NTRN 12.10/100A	2080076	101 1626	NTRN 16.10/100A	208 1092	101 1722
			NTRN 12.11/100A	2080078	101 1627	NTRN 16.11/100A	208 1095	101 1723
			NTRN 12.12/100A	2080080	101 1628	NTRN 16.12/100A	208 1097	101 1724
A	150		NTRN 12.1/150A	2080098	101 1631	NTRN 16.1/150A	208 1098	101 1725
			NTRN 12.2/150A	2080100	101 1632	NTRN 16.2/150A	208 1100	101 1726
			NTRN 12.3/150A	2080111	101 1633	NTRN 16.3/150A	208 1111	101 1727
			NTRN 12.4/150A	2080122	101 1635	NTRN 16.4/150A	208 1122	101 1729
			NTRN 12.5/150A	2080133	101 1637	NTRN 16.5/150A	208 1133	101 1731
			NTRN 12.6/150A	2080144	101 1639	NTRN 16.6/150A	208 1144	101 1733
			NTRN 12.7/150A	2080150	101 1641	NTRN 16.7/150A	208 1150	101 1735
			NTRN 12.8/150A	2080155	101 1643	NTRN 16.8/150A	208 1155	101 1737
			NTRN 12.9/150A	2080160	101 1645	NTRN 16.9/150A	208 1160	101 1739
			NTRN 12.10/150A	2080166	101 1647	NTRN 16.10/150A	208 1166	101 1741
			NTRN 12.11/150A	2080170	101 1649	NTRN 16.11/150A	208 1170	101 1743
			NTRN 12.12/150A	2080177	101 1651	NTRN 16.12/150A	208 1177	101 1745
A	200	168	NTRN 12.1/200A	2080186	101 1656	NTRN 16.1/200A	208 1180	101 1747
			NTRN 12.2/200A	2080188	101 1657	NTRN 16.2/200A	208 1188	101 1748
			NTRN 12.3/200A	2080199	101 1658	NTRN 16.3/200A	208 1199	101 1749

Other configurations: upon request.

**Al cam drums**  
**12 and 16 mm slot spacing**  
**Version B**



The illustrated cams do not form part of the cam drum scope of delivery and must be ordered separately.



Dimensions version B

Ver- sion	Outer ∅ D (mm)	Inner ∅ d (mm, ap- prox. values)	Slot spacing 12 mm			Slot spacing 16 mm					
			Form	Cata- logue no.	Order no.	Form	Cata- logue no.	Order no.			
B	150	118	NTRN 12.3/150B	2080115	101 1634	NTRN 16.3/150B	208 1115	101 1728			
			NTRN 12.4/150B	2080125	101 1636	NTRN 16.4/150B	208 1125	101 1730			
			NTRN 12.5/150B	2080135	101 1638	NTRN 16.5/150B	208 1135	101 1732			
			NTRN 12.6/150B	2080145	101 1640	NTRN 16.6/150B	208 1145	101 1734			
			NTRN 12.7/150B	2080152	101 1642	NTRN 16.7/150B	208 1152	101 1736			
			NTRN 12.8/150B	2080157	101 1644	NTRN 16.8/150B	208 1157	101 1738			
			NTRN 12.9/150B	2080163	101 1646	NTRN 16.9/150B	208 1163	101 1740			
			NTRN 12.10/150B	2080168	101 1648	NTRN 16.10/150B	208 1168	101 1742			
			NTRN 12.11/150B	2080174	100 4129	NTRN 16.11/150B	208 1174	101 1744			
			NTRN 12.12/150B	2080178	101 1652	NTRN 16.12/150B	208 1178	101 1746			
			B	200	168	NTRN 12.4/200B	2080211	101 1663	NTRN 16.4/200B	208 1211	101 1750
						NTRN 12.5/200B	2080222	101 1664	NTRN 16.5/200B	208 1222	101 1751
NTRN 12.6/200B	2080233	101 1665				NTRN 16.6/200B	208 1233	101 1753			
NTRN 12.7/200B	2080240	101 1666				NTRN 16.7/200B	208 1240	101 1754			
NTRN 12.8/200B	2080244	101 1667				NTRN 16.8/200B	208 1244	101 1755			
NTRN 12.9/200B	2080250	101 1668				NTRN 16.9/200B	208 1250	101 1756			
NTRN 12.10/200B	2080255	101 1669				NTRN 16.10/200B	208 1255	101 1757			
NTRN 12.11/200B	2080260	101 1670				NTRN 16.11/200B	208 1260	101 1758			
NTRN 12.12/200B	2080266	101 1671				NTRN 16.12/200B	208 1266	101 1759			

Other configurations: upon request.

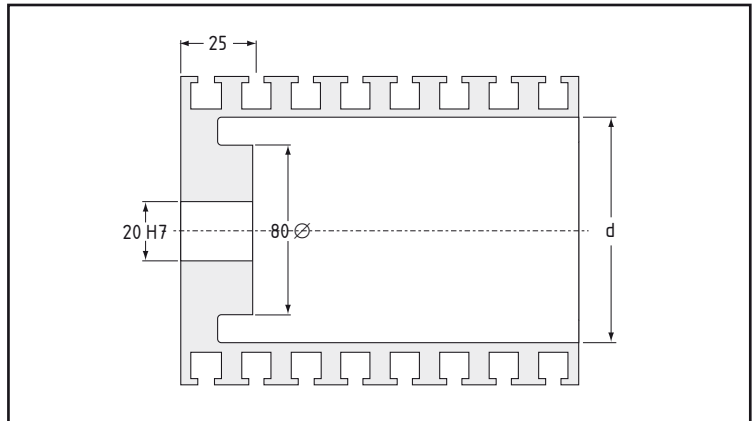
# Al cam drums

## 12 and 16 mm slot spacing

### Version C



The illustrated cams do not form part of the cam drum scope of delivery and must be ordered separately.

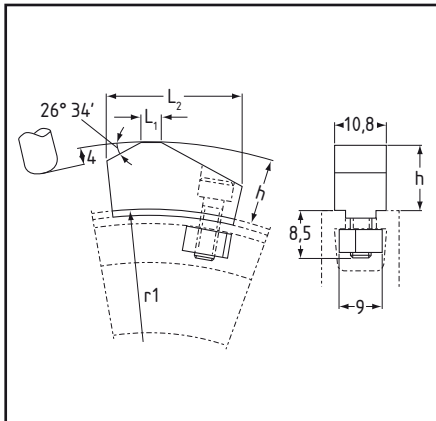


Dimensions version C

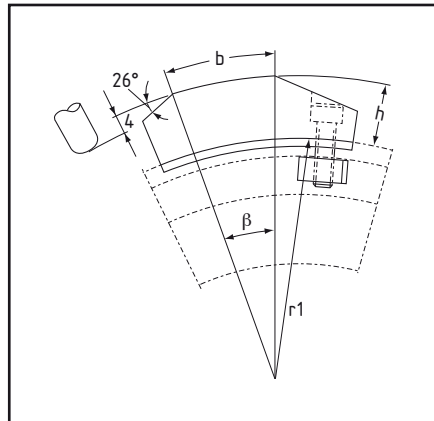
Version	Outer Ø D (mm)	Inner Ø d (mm, approx. values)	Slot spacing 12 mm			Slot spacing 16 mm		
			Form	Catalogue no.	Order no.	Form	Catalogue no.	Order no.
C	250	218	NTRN 12.1/250C/A	2080272	101 1674	NTRN 16.1/250C/A	208 1270	101 1760
			NTRN 12.2/250C/A	2080277	101 1675	NTRN 16.2/250C/A	208 1277	101 1761
			NTRN 12.3/250C	2080288	117 9118	NTRN 16.3/250C	208 1288	101 1762
			NTRN 12.4/250C	2080299	101 1677	NTRN 16.4/250C	208 1299	101 1763
			NTRN 12.5/250C	2080311	101 1678	NTRN 16.5/250C	208 1311	101 1764
			NTRN 12.6/250C	2080322	101 1679	NTRN 16.6/250C	208 1322	101 1765
			NTRN 12.7/250C	2080330	101 1680	NTRN 16.7/250C	208 1330	101 1767
			NTRN 12.8/250C	2080333	101 1681	NTRN 16.8/250C	208 1333	101 1768
			NTRN 12.9/250C	2080340	101 1682	NTRN 16.9/250C	208 1340	101 1769
			NTRN 12.10/250C	2080344	101 1683	NTRN 16.10/250C	208 1344	101 1770
			NTRN 12.11/250C	2080350	101 1684	NTRN 16.11/250C	208 1350	101 1771
			NTRN 12.12/250C	2080355	101 1685	NTRN 16.12/250C	208 1355	101 1772
C	320	288	NTRN 12.1/320C/A	2080360	101 1688	NTRN 16.1/320C/A	208 1360	101 1773
			NTRN 12.2/320C/A	2080366	101 1689	NTRN 16.2/320C/A	208 1366	101 1774
			NTRN 12.3/320C	2080377	101 1690	NTRN 16.3/320C	208 1377	101 1775
			NTRN 12.4/320C	2080388	101 1691	NTRN 16.4/320C	208 1388	101 1776
			NTRN 12.5/320C	2080399	101 1692	NTRN 16.5/320C	208 1399	101 1777
			NTRN 12.6/320C	2080411	101 1693	NTRN 16.6/320C	208 1411	101 1778
			NTRN 12.7/320C	2080420	101 1694	NTRN 16.7/320C	208 1420	101 1779
			NTRN 12.8/320C	2080422	101 1695	NTRN 16.8/320C	208 1422	101 1780
			NTRN 12.9/320C	2080430	101 1697	NTRN 16.9/320C	208 1430	101 1781
			NTRN 12.10/320C	2080433	101 1698	NTRN 16.10/320C	208 1433	101 1782
			NTRN 12.11/320C	2080440	101 1699	NTRN 16.11/320C	208 1440	101 1783
			NTRN 12.12/320C	2080444	101 1700	NTRN 16.12/320C	208 1444	101 1784

Other radii, cam numbers and configurations: upon request.

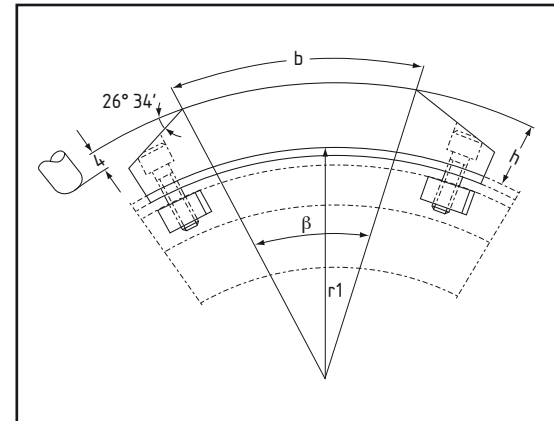
# Radial cams with adjusted radii for 12 and 16 mm slot spacing



Version 1:  
Running surface with linear dimensioning



Version 2:  
Running surface with angled dimensioning



Version 3:  
Running surface with angled dimensioning

r (mm)	Length (mm)		Cam height h = 12.5 mm				Cam height h = 14 mm				Cam height h = 16 mm				
	L <sub>1</sub>	L <sub>2</sub>	Δ	β	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalogue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalogue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form
							NTR ...								NTR ...
40	4	33	-	-	1	4.28.40	2289920/ 1012265	-	1	4.28.40.4	2289924/ 1012266	-	1	4.28.40.42	2289926/ 1012267
	10	38	-	-	1	10.36.40	2289930/ 1012268	-	1	10.36.40.4	2289934/ 1012269	-	1	10.36.40.42	2289936/ 1012270
	-	-	15°	13,7	2	15.40	2289940/ 1012271	14.1	2	15.40.4	2289944/ 1012272	14.6	2	15.40.42	2289946/ 1012273
	-	-	30°	27,5	2	30.40	2289990/ 1012287	28.3	2	30.40.4	2289994/ 1012288	29.3	2	30.40.42	2289996/ 1012289
	-	-	45°	41.2	2	45.40	2289980/ 1012284	42.4	2	45.40.4	2289984/ 1012285	44	2	45.40.42	2289986/ 1012286
	-	-	60°	55	3	60.40	2289970/ 1012281	56.5	3	60.40.4	2289974/ 1012282	58.5	3	60.40.42	2289976/ 1012283
	-	-	75°	68.7	3	75.40	2289960/ 1012278	70.7	3	75.40.4	2289964/ 1012279	73.3	3	75.40.42	2289966/ 1012280
	-	-	90°	82.5	3	90.40	2289950/ 1012275	84.8	3	90.40.4	2289954/ 1012276	88	3	90.40.42	2289956/ 1012277

<sup>1</sup> See drawing page 12  
Other configurations: upon request.

r (mm)	Length (mm)			Cam height h = 12.5 mm				Cam height h = 14 mm				Cam height h = 16 mm			
	L <sub>1</sub>	L <sub>2</sub>	Δ β	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalogue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalogue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalogue no./ order no.
50	4	33	-	-	1	4.28.50	2290002/ 1014959	-	1	4.28.50.4	2290022/ 1014828	-	1	4.28.50.42	2290042/ 1012307
	10	38	-	-	1	10.36.50	2290004/ 1014960	-	1	10.36.50.4	2290024/ 1014829	-	1	10.36.50.42	2290044/ 1012308
	-	-	15°	16.4	2	15.50	2290006/ 1014975	16.8	2	15.50.4	2290026/ 1014844	17.2	2	15.50.42	2290046/ 1012309
	-	-	30°	32.7	2	30.50	2290008/ 1014976	33.5	2	30.50.4	2290028/ 1014845	34.5	2	30.50.42	2290048/ 1012310
	-	-	45°	49.1	2	45.50	2290010/ 1014977	50.3	2	45.50.4	2290030/ 1014846	51.8	2	45.50.42	2290050/ 1012311
	-	-	60°	65.5	3	60.50	2290012/ 1015012	67	3	60.50.4	2290032/ 1015021	69	3	60.50.42	2290052/ 1012312
	-	-	75°	81.8	3	75.50	2290014/ 1015019	83.8	3	75.50.4	2290034/ 1015022	86.4	3	75.50.42	2290054/ 1012313
	-	-	90°	98.2	3	90.50	2290016/ 1015020	100.5	3	90.50.4	2290036/ 1015023	103.6	3	90.50.42	2290056/ 1012314
75	4	33	-	-	1	4.28.75	2290122/ 1014961	-	1	4.28.75.4	2290142/ 1014830	-	1	4.28.75.42	2290233/ 1012331
	10	38	-	-	1	10.36.75	2290124/ 1014962	-	1	10.36.75.4	2290144/ 1014831	-	1	10.36.75.42	2290244/ 1012332
	-	-	15°	22.9	3	15.75	2290126/ 1014978	23.3	3	15.75.4	2290146/ 1014847	23.8	3	15.75.42	2290266/ 1012334
	-	-	30°	45.8	3	30.75	2290128/ 1014979	46.6	3	30.75.4	2290166/ 1012330	47.6	3	30.75.42	2290277/ 1012335
	-	-	45°	68.7	3	45.75	2290130/ 1014980	69.9	3	45.75.4	2290177/ 1014849	71.5	3	45.75.42	2290288/ 1012336
	-	-	60°	91.6	3	60.75	2290132/ 1014981	93.2	3	60.75.4	2290188/ 1014850	95.3	3	60.75.42	2290299/ 1012337
	-	-	75°	114.5	3	75.75	2290134/ 1014982	116.5	3	75.75.4	2290199/ 1014851	119	3	75.75.42	2290300/ 1012338
	-	-	90°	137.5	3	90.75	2290136/ 1014983	139.8	3	90.75.4	2290200/ 1014852	143	3	90.75.42	2290311/ 1012339
	-	-	105°	160.4	3	105.75	2290138/ 1014984	163.1	3	105.75.4	2290211/ 1014853	166.7	3	105.75.42	2290322/ 1012340
	-	-	120°	183.3	3	120.75	2290140/ 1014985	186.4	3	120.75.4	2290222/ 1014854	190.6	3	120.75.42	2290333/ 1012341

1 See drawing page 12

Other configurations: upon request.

**Radial cams**  
with adjusted radii  
for 12 and 16 mm slot spacing (continued)



r (mm)	Length (mm)				Cam height h = 12.5 mm				Cam height h = 14 mm				Cam height h = 16 mm			
	L <sub>1</sub>	L <sub>2</sub>	Δ	β	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.
100	4	33	-	-	1	4.28.100	2290544/ 1014963	-	1	4.28.100.4	2291011/ 1014833	-	1	4.28.100.42	2291744/ 1012369	
	10	38	-	-	1	10.36.100	2290553/ 1014964	-	1	10.36.100.4	2291100/ 1014832	-	1	10.36.100.42	2291754/ 1012370	
	-	48	-	-	1	20.46.100	2290600/ 1014965	-	1	20.46.100.4	2291151/ 1014834	-	1	20.46.100.42	2291801/ 1012371	
	-	-	15°	29.5	3	15.100	2290651/ 1014994	29.9	3	15.100.4	2291207/ 1014855	30.4	3	15.100.42	2291851/ 1012372	
	-	-	30°	58.9	3	30.100	2290707/ 1014995	59.7	3	30.100.4	2291258/ 1014856	60.7	3	30.100.42	2291908/ 1012373	
	-	-	45°	88.4	3	45.100	2290758/ 1014996	89.5	3	45.100.4	2291304/ 1014857	91.1	3	45.100.42	2291959/ 1012374	
	-	-	60°	117.8	3	60.100	2290804/ 1014997	119.4	3	60.100.4	2291355/ 1014858	121.5	3	60.100.42	2292009/ 1012375	
	-	-	75°	147.3	3	75.100	2290855/ 1014998	149.2	3	75.100.4	2291401/ 1014859	151.8	3	75.100.42	2292050/ 1012376	
	-	-	90°	176.7	3	90.100	2290901/ 1014999	179.1	3	90.100.4	2291452/ 1014860	182.2	3	90.100.42	2292106/ 1012377	
	-	-	105°	206.2	3	105.100	2290952/ 1015000	208.9	3	105.100.4	2291509/ 1014861	212.6	3	105.100.42	2292157/ 1012378	
	-	-	120°	235.6	3	120.100	2291002/ 1015001	238.8	3	120.100.4	2291550/ 1014862	243	3	120.100.42	2292203/ 1012379	
	125	4	33	-	-	1	4.28.125	2292211/ 1014966	-	1	4.28.125.4	2292866/ 1014837	-	1	4.28.125.42	2293411/ 1012417
10		38	-	-	1	10.36.125	2292408/ 1014967	-	1	10.36.125.4	2292955/ 1014836	-	1	10.36.125.42	2293501/ 1012418	
20		48	-	-	1	20.46.125	2292460/ 1014968	-	1	20.46.125.4	2293005/ 1014835	-	1	20.46.125.42	2293552/ 1012419	
-		-	15°	36	3	15.125	2292505/ 1012381	36.4	3	15.125.4	2293056/ 1014863	36.9	3	15.125.42	2293609/ 1012420	
-		-	30°	72	3	30.125	2292556/ 1012385	72.8	3	30.125.4	2293102/ 1014864	73.8	3	30.125.42	2293650/ 1012421	
-		-	45°	108	3	45.125	2292602/ 1012388	109.2	3	45.125.4	2293153/ 1014865	110.7	3	45.125.42	2293706/ 1012422	
-		-	60°	144	3	60.125	2292653/ 1012390	145.6	3	60.125.4	2293200/ 1014866	147.6	3	60.125.42	2293757/ 1012423	
-		-	75°	180	3	75.125	2292700/ 1012391	182	3	75.125.4	2293251/ 1014867	184.5	3	75.125.42	2293803/ 1012424	
-		-	90°	216	3	90.125	2292751/ 1012392	218.3	3	90.125.4	2293307/ 1012412	221.4	3	90.125.42	2293854/ 1012425	
-		-	105°	252	3	105.125	2292807/ 1012393	254.7	3	105.125.4	2293358/ 1014869	258.4	3	105.125.42	2293901/ 1012426	
-		-	120°	288	3	120.125	2292858/ 1012396	291.1	3	120.125.4	2293404/ 1014870	295.3	3	120.125.42	2293951/ 1012427	

<sup>1</sup> See drawing page 12

Other configurations: upon request.

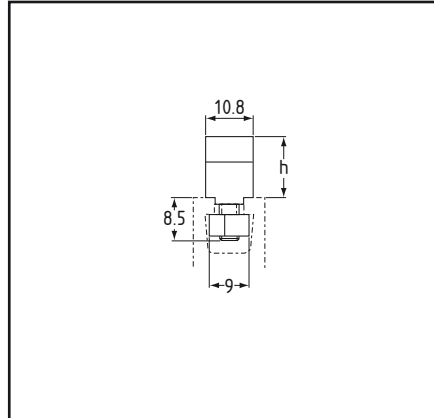
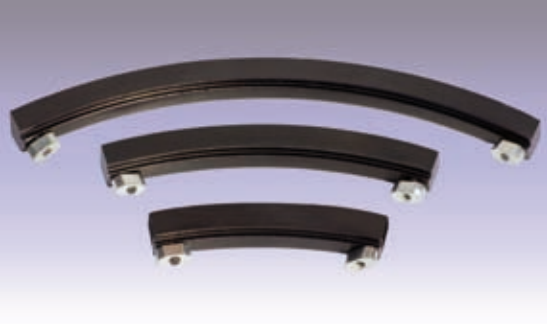


r (mm)	Length (mm)				Cam height h = 12.5 mm				Cam height h = 14 mm				Cam height h = 16 mm			
	L <sub>1</sub>	L <sub>2</sub>	α	β	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.
160	4	33	-	-	1	4.28.160	2293966/ 1014969	-	1	4.28.160.4	2294755/ 1014838	-	1	4.28.160.42	2295300/ 1012436	
	10	38	-	-	1	10.36.160	2294206/ 1014970	-	1	10.36.160.4	2294800/ 1014839	-	1	10.36.160.42	2295407/ 1012437	
	20	48	-	-	1	20.46.160	2294257/ 1014971	-	1	20.46.160.4	2294851/ 1014840	14.6	1	20.46.160.42	2295458/ 1012438	
	-	-	15°	45.2	3	15.160	2294303/ 1015002	45.6	3	15.160.4	2294907/ 1014871	29.3	3	15.160.42	2295504/ 1012439	
	-	-	30°	90.3	3	30.160	2294354/ 1015003	91.1	3	30.160.4	2294958/ 1014872	44	3	30.160.42	2295555/ 1012440	
	-	-	45°	135.5	3	45.160	2294401/ 1015004	136.7	3	45.160.4	2295008/ 1014873	58.5	3	45.160.42	2295601/ 1012441	
	-	-	60°	180.6	3	60.160	2294451/ 1015005	182.2	3	60.160.4	2295059/ 1014874	73.3	3	60.160.42	2295652/ 1012442	
	-	-	75°	225.8	3	75.160	2294508/ 1015006	227.8	3	75.160.4	2295105/ 1014875	88	3	75.160.42	2295709/ 1012443	
	-	-	90°	271	3	90.160	2294559/ 1015007	273.3	3	90.160.4	2295156/ 1014876		3	90.160.42	2295750/ 1012444	
	-	-	105°	316.1	3	105.160	2294605/ 1015008	318.9	3	105.160.4	2295202/ 1014877	190.6	3	105.160.42	2295806/ 1012445	
	-	-	120°	361.3	3	120.160	2294656/ 1015009	364.4	3	120.160.4	2295253/ 1014878		3	120.160.42	2295857/ 1012446	
	250	4	33	-	-	1	4.28.250	2296400/ 1014972	-	1	4.28.250.4	2297300/ 1014843	-	1	4.28.250.42	2298200/ 1012468
10		38	-	-	1	10.36.250	2296403/ 1014973	-	1	10.36.250.4	2297302/ 1014842	-	1	10.36.250.42	2298201/ 1012469	
20		48	-	-	1	20.46.250	2296454/ 1014974	-	1	20.46.250.4	2297353/ 1014841	23.8	1	20.46.250.42	2298252/ 1012470	
-		-	15°	68.7	3	15.250	2296501/ 1015010	69.1	3	15.250.4	2297400/ 1014879	47.6	3	15.250.42	2298309/ 1012471	
-		-	30°	137.5	3	30.250	2296551/ 1015013	138.2	3	30.250.4	2297451/ 1014880	71.5	3	30.250.42	2298350/ 1012472	
-		-	45°	206.2	3	45.250	2296608/ 1015011	207.4	3	45.250.4	2297507/ 1014881	95.3	3	45.250.42	2298406/ 1012473	
-		-	60°	275	3	60.250	2296659/ 1015014	276.5	3	60.250.4	2297558/ 1014882	119	3	60.250.42	2298457/ 1012474	
-		-	75°	343.4	3	75.250	2296705/ 1015015	345.6	3	75.250.4	2297604/ 1014883	143	3	75.250.42	2298503/ 1012475	
-		-	90°	412.3	3	90.250	2296756/ 1015016	414.7	3	90.250.4	2297655/ 1014884	166.7	3	90.250.42	2298554/ 1012476	
-		-	105°	481.1	3	105.250	2296802/ 1015017	483.8	3	105.250.4	2297701/ 1014885	190.6	3	105.250.42	2298601/ 1012477	
-		-	120°	549.8	3	120.250	2296853/ 1015018	552.9	3	120.250.4	2297752/ 1014886		3	120.250.42	2298651/ 1012478	

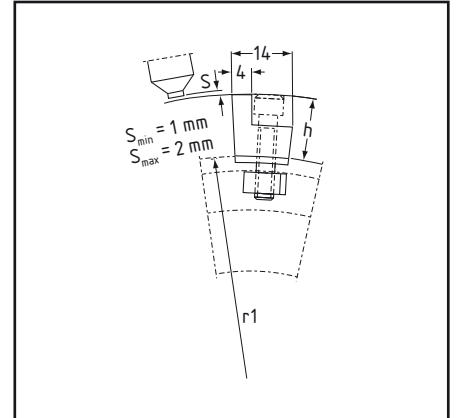
<sup>1</sup> See drawing page 12

Other configurations: upon request.

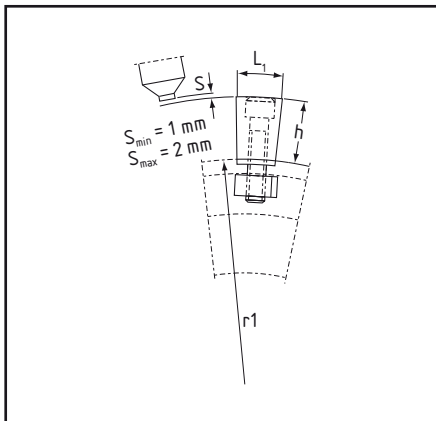
# Proximity radial cams for inductive multi-position switches



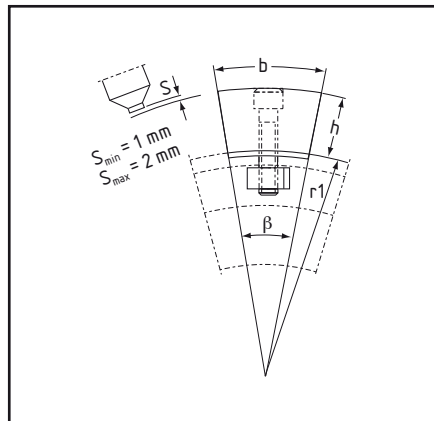
Side view



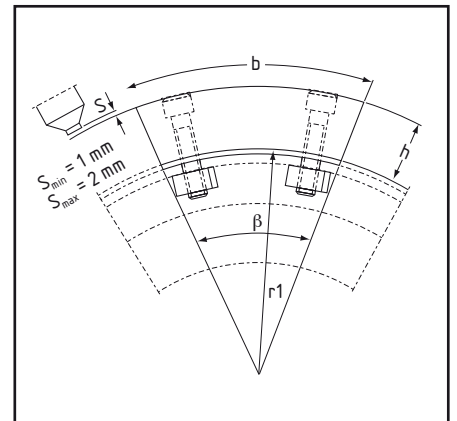
Version 1:  
Short cam



Version 2:  
Running surface with linear dimensioning



Version 3:  
Running surface with angled dimensioning



Version 4:  
Running surface with angled dimensioning



r (mm)	Length (mm)			Cam height h = 12.5 mm				Cam height h = 14 mm				Cam height h = 16 mm			
	L <sub>1</sub>	L <sub>2</sub>	α β	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.
40	4	14	-	-	1	4.14.40	2284800/ 1015106	-	1	4.14.40.4	2284900/ 1015127	-	1	4.14.40.42	2284950/ 1012075
	10	-	-	-	2	10.40	2284804/ 1015113	-	2	10.40.4	2284904/ 1015133	-	2	10.40.42	2284955/ 1012076
	20	-	-	-	2	20.40	2284806/ 1015114	-	2	20.40.4	2284906/ 1015134	-	2	20.40.42	2284960/ 1012077
	-	-	15°	13.7	3	15.40	2284810/ 1012061	14.1	3	15.40.4	2284910/ 1012069	14.6	3	15.40.42	2284965/ 1012078
	-	-	30°	27.5	3	30.40	2284820/ 1012062	28.3	3	30.40.4	2284920/ 1012070	29.3	3	30.40.42	2284970/ 1012079
	-	-	45°	41.2	4	45.40	2284830/ 1012063	42.4	4	45.40.4	2284930/ 1012071	44	4	45.40.42	2284975/ 1012080
	-	-	60°	55	4	60.40	2284834/ 1012064	56.5	4	60.40.4	2284934/ 1012072	58.6	4	60.40.42	2284980/ 1012081
	-	-	75°	68.7	4	75.40	2284836/ 1012065	70.7	4	75.40.4	2284936/ 1012073	73.3	4	75.40.42	2284985/ 1012082
	-	-	90°	82.5	4	90.40	2284840/ 1012066	84.8	4	90.40.4	2284940/ 1012074	88	4	90.40.42	2284990/ 1012083
50	4	14	-	-	1	4.14.50	2285011/ 1015107	-	1	4.14.50.4	2285111/ 1051896	-	1	4.14.50.42	2285211/ 1012106
	10	-	-	-	2	10.50	2285022/ 1015116	-	2	10.50.4	2285122/ 1015136	-	2	10.50.42	2285222/ 1012107
	-	-	-	-	2	20.50	2285033/ 1015115	-	2	20.50.4	2285133/ 1015135	-	2	20.50.42	2285233/ 1012108
	-	-	15°	16.4	3	15.50	2285044/ 1012089	16.8	3	15.50.4	2285144/ 1012100	17.2	3	15.50.42	2285244/ 1012109
	-	-	30°	32.7	3	30.50	2285055/ 1012091	33.5	3	30.50.4	2285155/ 1012101	34.5	3	30.50.42	2285255/ 1012110
	-	-	45°	49.1	4	45.50	2285066/ 1012092	50.3	4	45.50.4	2285166/ 1012102	51.8	4	45.50.42	2285266/ 1012111
	-	-	60°	65.5	4	60.50	2285077/ 1012093	67	4	60.50.4	2285177/ 1012103	69	4	60.50.42	2285277/ 1012112
	-	-	75°	81.8	4	75.50	2285088/ 1012095	83.8	4	75.50.4	2285188/ 1012104	86.4	4	75.50.42	2285288/ 1012113
	-	-	90°	98.2	4	90.50	2285099/ 1012096	100.5	4	90.50.4	2285199/ 1012105	103.6	4	90.50.42	2285299/ 1012114

1 See drawing page 16

Other configurations: upon request.

## Proximity radial cams for inductive multi-position switches (continued)



r (mm)	Length (mm)			Cam height h = 12.5 mm				Cam height h = 14 mm				Cam height h = 16 mm			
	L <sub>1</sub>	L <sub>2</sub>	α β	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.
75	4	14	-	-	1	4.14.75	2285300/ 1015108	-	1	4.14.75.4	2285400/ 1015128	-	1	4.14.75.42	2285500/ 1012132
	10	-	-	-	2	10.75	2285311/ 1015117	-	2	10.75.4	2285411/ 1015137	-	2	10.75.42	2285511/ 1012133
	20	-	-	-	2	20.75	2285322/ 1015118	-	2	20.75.4	2285422/ 1015138	-	2	20.75.42	2285522/ 1012134
	-	-	15°	22.9	3	15.75	2285333/ 1012115	23.3	3	15.75.4	2285433/ 1012124	23.8	3	15.75.42	2285533/ 1012135
	-	-	30°	45.8	4	30.75	2285344/ 1012116	46.6	4	30.75.4	2285444/ 1012125	47.6	4	30.75.42	2285544/ 1012136
	-	-	45°	68.7	4	45.75	2285350/ 1012117	69.9	4	45.75.4	2285450/ 1012126	71.5	4	45.75.42	2285550/ 1012137
	-	-	60°	91.6	4	60.75	2285355/ 1012118	93.2	4	60.75.4	2285455/ 1012127	95.3	4	60.75.42	2285555/ 1012138
	-	-	75°	114.5	4	75.75	2285366/ 1012119	116.5	4	75.75.4	2285466/ 1012128	119	4	75.75.42	2285566/ 1012139
	-	-	90°	137.5	4	90.75	2285377/ 1012120	139.8	4	90.75.4	2285477/ 1012129	143	4	90.75.42	2285577/ 1012140
	-	-	105°	160.4	4	105.75	2285388/ 1012121	163.1	4	105.75.4	2285488/ 1012130	166.7	4	105.75.42	2285588/ 1012141
	-	-	120°	183.3	4	120.75	2285399/ 1012122	186.4	4	120.75.4	2285499/ 1012131	190.6	4	120.75.42	2285599/ 1012142
100	4	14	-	-	1	4.14.100	2285600/ 1015109	-	1	4.14.100.4	2285700/ 1015129	-	1	4.14.100.42	2285800/ 1012162
	10	-	-	-	2	10.100	2285611/ 1015119	-	2	10.100.4	2285711/ 1015140	-	2	10.100.42	2285811/ 1012163
	20	-	-	-	2	20.100	2285622/ 1015120	-	2	20.100.4	2285722/ 1015139	-	2	20.100.42	2285822/ 1012164
	-	-	15°	29.5	3	15.100	2285633/ 1012143	29.9	3	15.100.4	2285733/ 1012151	30.4	3	15.100.42	2285833/ 1012165
	-	-	30°	58.9	4	30.100	2285644/ 1012144	59.7	4	30.100.4	2285744/ 1012152	60.7	4	30.100.42	2285844/ 1012166
	-	-	45°	88.4	4	45.100	2285650/ 1012145	89.5	4	45.100.4	2285750/ 1012153	91.1	4	45.100.42	2285850/ 1012167
	-	-	60°	117.8	4	60.100	2285655/ 1012146	119.4	4	60.100.4	2285755/ 1012154	121.5	4	60.100.42	2285855/ 1012168
	-	-	75°	147.3	4	75.100	2285666/ 1012147	149.2	4	75.100.4	2285766/ 1012156	151.8	4	75.100.42	2285866/ 1012169
	-	-	90°	176.7	4	90.100	2285677/ 1012148	179.1	4	90.100.4	2285777/ 1012157	182.2	4	90.100.42	2285877/ 1012170
	-	-	105°	206.2	4	105.100	2285688/ 1012149	208.9	4	105.100.4	2285788/ 1012158	212.6	4	105.100.42	2285888/ 1012171
	-	-	120°	235.6	4	120.100	2285699/ 1012150	238.8	4	120.100.4	2285799/ 1012161	243	4	120.100.42	2285899/ 1012172

<sup>1</sup> See drawing page 16

Other configurations: upon request.

r (mm)	Length (mm)			Cam height h = 12.5 mm				Cam height h = 14 mm				Cam height h = 16 mm			
	L <sub>1</sub>	L <sub>2</sub>	α β	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.
125	4	14	-	-	1	4.14.125	2285900/ 1015110	-	1	4.14.125.4	2286000/ 1012180	-	1	4.14.125.42	2286100/ 1012189
	10	-	-	-	2	10.125	2285911/ 1015122	-	2	10.125.4	2286011/ 1015141	-	2	10.125.42	2286111/ 1012190
	20	-	-	-	2	20.125	2285922/ 1015121	-	2	20.125.4	2286022/ 1015142	-	2	20.125.42	2286122/ 1012191
	-	-	15°	36	3	15.125	2285933/ 1012173	36.4	3	15.125.4	2286033/ 1012181	36.9	3	15.125.42	2286133/ 1012192
	-	-	30°	72	4	30.125	2285944/ 1012174	72.8	4	30.125.4	2286044/ 1012182	73.8	4	30.125.42	2286144/ 1012193
	-	-	45°	108	4	45.125	2285950/ 1015149	109.2	4	45.125.4	2286050/ 1012183	110.7	4	45.125.42	2286150/ 1012194
	-	-	60°	144	4	60.125	2285955/ 1012645	145.6	4	60.125.4	2286055/ 1012184	147.6	4	60.125.42	2286155/ 1012195
	-	-	75°	180	4	75.125	2285966/ 1012176	182	4	75.125.4	2286066/ 1012185	184.5	4	75.125.42	2286166/ 1012196
	-	-	90°	216	4	90.125	2285977/ 1012177	218.3	4	90.125.4	2286077/ 1012186	221.4	4	90.125.42	2286177/ 1012197
	-	-	105°	252	4	105.125	2285988/ 1012178	254.7	4	105.125.4	2286088/ 1012187	258.4	4	105.125.42	2286188/ 1012198
	-	-	120°	288	4	120.125	2285999/ 1012179	291.1	4	120.125.4	2286099/ 1012188	295.3	4	120.125.42	2286199/ 1012199
160	4	14	-	-	1	4.14.160	2286200/ 1015111	-	1	4.14.160.4	2286300/ 1015131	-	1	4.14.160.42	2286400/ 1012216
	10	-	-	-	2	10.160	2286211/ 1015123	-	2	10.160.4	2286311/ 1015144	-	2	10.160.42	2286411/ 1012217
	20	-	-	-	2	20.160	2286222/ 1015124	-	2	20.160.4	2286322/ 1015143	-	2	20.160.42	2286422/ 1012218
	-	-	15°	45.2	3	15.160	2286233/ 1022646	45.6	3	15.160.4	2286333/ 1012208	46	3	15.160.42	2286433/ 1012219
	-	-	30°	90.3	4	30.160	2286244/ 1012201	91.1	4	30.160.4	2286344/ 1012209	92.1	4	30.160.42	2286444/ 1012220
	-	-	45°	135.5	4	45.160	2286250/ 1012202	136.7	4	45.160.4	2286350/ 1012210	138.2	4	45.160.42	2286450/ 1012221
	-	-	60°	180.6	4	60.160	2286255/ 1012203	182.2	4	60.160.4	2286355/ 1012211	184.3	4	60.160.42	2286455/ 1012222
	-	-	75°	225.8	4	75.160	2286266/ 1012204	227.8	4	75.160.4	2286366/ 1012212	230.4	4	75.160.42	2286466/ 1012223
	-	-	90°	271	4	90.160	2286277/ 1012205	273.3	4	90.160.4	2286377/ 1012213	276.5	4	90.160.42	2286477/ 1012224
	-	-	105°	316.1	4	105.160	2286288/ 1012206	318.9	4	105.160.4	2286388/ 1012214	322.5	4	105.160.42	2286488/ 1012225
	-	-	120°	361.3	4	120.160	2286299/ 1012207	364.4	4	120.160.4	2286399/ 1012215	368.6	4	120.160.42	2286499/ 1012226

1 See drawing page 16

Other configurations: upon request.

## Proximity radial cams for inductive multi-position switches (continued)



r (mm)	Length (mm)			Cam height h = 12.5 mm				Cam height h = 14 mm				Cam height h = 16 mm			
	L <sub>1</sub>	L <sub>2</sub>	Δ β	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.	Curve length b (mm)	Ver sion <sup>1</sup>	Form	Catalo- gue no./ order no.
250	4	14	-	-	1	4.14.250	2286500/ 1015112	-	1	4.14.250.4	2286600/ 1015132	-	1	4.14.250.42	2286700/ 1012246
	10	-	-	-	2	10.250	2286511/ 1015126	-	2	10.250.4	2286611/ 1015145	-	2	10.250.42	2286711/ 1012247
	20	-	-	-	2	20.250	2286522/ 1015125	-	2	20.250.4	2286622/ 1015146	-	2	20.250.42	2286722/ 1012248
	-	-	15°	68.7	3	15.250	2286533/ 1012229	69.1	3	15.250.4	2286633/ 1012238	69.6	3	15.250.42	2286733/ 1012249
	-	-	30°	137.5	4	30.250	2286544/ 1012230	138.2	4	30.250.4	2286644/ 1012239	139.2	4	30.250.42	2286744/ 1012250
	-	-	45°	206.2	4	45.250	2286550/ 1012231	207.4	4	45.250.4	2286650/ 1012240	209	4	45.250.42	2286750/ 1012251
	-	-	60°	275	4	60.250	2286555/ 1012233	276.5	4	60.250.4	2286655/ 1012241	278.5	4	60.250.42	2286755/ 1012252
	-	-	75°	343.4	4	75.250	2286566/ 1012234	345.6	4	75.250.4	2286666/ 1012242	348.2	4	75.250.42	2286766/ 1012253
	-	-	90°	412.3	4	90.250	2286577/ 1012235	414.7	4	90.250.4	2286677/ 1012243	418	4	90.250.42	2286777/ 1012254
	-	-	105°	481.1	4	105.250	2286588/ 1012236	483.8	4	105.250.4	2286688/ 1012244	487.5	4	105.250.42	2286788/ 1012255
	-	-	120°	549.8	4	120.250	2286599/ 1012237	552.9	4	120.250.4	2286699/ 1012245	557	4	120.250.42	2286799/ 1012256

1 See drawing page 16

Other configurations: upon request.

## Auxiliary equipment/information

Individual parts for cam drums and radial cams	Form	Catalogue no.	Order no.
Slot bolt:			
• with insertion from above for NTR and NIR cams	NI 4.14-2	240 3232	100 3259
• for lateral insertion only into NTR and NIR cams	NI 4.14-3	240 3236	100 2921
Pressure spring for M4 fastening screws	NT 0.16-5	240 3129	100 3258

Fastening screws with hexagon socket			
NTR/NTRF cams		M 4 × 12 DIN 912	
NIR cams	Cam height 12.5 mm	M 4 × 16 DIN 912	
	Cam height 14 mm	M 4 × 18 DIN 912	
	Cam height 16 mm	M 4 × 20 DIN 912	
	Exception: short cams NIR 4.14	M 4 × 12 DIN 912	
Aluminium cam semicircles		M 4 × 8 DIN 912	

## T-slot clam drums and radial cams for 8 mm slot spacing

### Information

Devices with 8 mm slot spacing are related to a design which has not been derived from the DIN standards and which is intended for specific applications where space is restricted. A range of different drum diameters and adapted proximity radial cams are offered for this purpose as follows:



The illustrated cams do not form part of the cam drum scope of delivery and must be ordered separately.

r (mm)	Length (mm)			Cam height h = 12.5 mm			Order no.
	L <sub>1</sub>	L <sub>2</sub>	α β	Curve length b (mm)	Version	Form	
40	4	14	–	–	1	NIR 4.14.40.8	Price and delivery period: upon request
	10	–	–	–	2	NIR 10.40.8	
	20	–	–	–	2	NIR 20.40.8	
	–	–	15°	13.7	3	NIR 15.40.8	
	–	–	30°	27.5	3	NIR 30.40.8	
	–	–	45°	41.2	4	NIR 45.40.8	
	–	–	60°	55	4	NIR 60.40.8	
	–	–	75°	68.7	4	NIR 75.40.8	
	–	–	90°	92.5	4	NIR 90.40.8	
–	–	120°	109.9	4	NIR 120.40.8		
50	4	14	–	–	1	NIR 4.14.50.8	Price and delivery period: upon request
	10	–	–	–	2	NIR 10.50.8	
	20	–	–	–	2	NIR 20.50.8	
	–	–	15°	16.4	3	NIR 15.50.8	
	–	–	30°	32.7	3	NIR 30.50.8	
	–	–	45°	49.1	4	NIR 45.50.8	
	–	–	60°	65.5	4	NIR 60.50.8	
	–	–	75°	81.8	4	NIR 75.50.8	
	–	–	90°	98.2	4	NIR 90.50.8	
75	4	15	–	–	1	NIR 4.15.75.8	Price and delivery period: upon request
	10	–	–	–	2	NIR 10.75.8	
	20	–	–	–	2	NIR 20.75.8	
	–	–	15°	22.9	3	NIR 15.75.8	
	–	–	30°	45.8	4	NIR 30.75.8	
	–	–	45°	68.7	4	NIR 45.75.8	
	–	–	60°	91.6	4	NIR 60.75.8	
	–	–	75°	114.5	4	NIR 75.75.8	
	–	–	90°	137.5	4	NIR 90.75.8	
–	–	105°	160.4	4	NIR 105.75.8		
–	–	120°	183.3	4	NIR 120.75.8		

### Additional ordering information

- Cam versions: see page 16
- T-slot cam drums: see page 9  
(order designation for 8 mm slot spacing NTRN 8 ... instead of NTRN 12 ... for corresponding drum diameters)
- Cams for mechanical actuation: see page 20



r (mm)	Length (mm)			Cam height h = 12.5 mm			Order no.
	L <sub>1</sub>	L <sub>2</sub>	α β	Curve length b (mm)	Version	Form	
40	4	33	–	–	1	NTR 4.28.40.8	Price and delivery period: upon request
	10	38	–	–	1	NTR 10.36.40.8	
	–	–	15°	13.7	2	NTR 15.40.8	
	–	–	30°	27.5	2	NTR 30.40.8	
	–	–	45°	41.2	3	NTR 45.40.8	
	–	–	60°	55	3	NTR 60.40.8	
	–	–	75°	68.7	3	NTR 75.40.8	
	–	–	90°	82.5	3	NTR 90.40.8	
50	4	33	–	–	1	NTR 4.28.50.8	Price and delivery period: upon request
	10	38	–	–	1	NTR 10.36.50.8	
	–	–	15°	16.4	2	NTR 15.50.8	
	–	–	30°	32.7	2	NTR 30.50.8	
	–	–	45°	49.1	2	NTR 45.50.8	
	–	–	60°	65.5	3	NTR 60.50.8	
	–	–	75°	81.8	3	NTR 75.50.8	
	–	–	90°	98.2	3	NTR 90.50.8	
75	4	33	–	–	1	NTR 4.28.75.8	Price and delivery period: upon request
	10	38	–	–	1	NTR 10.36.75.8	
	–	–	15°	22.9	3	NTR 15.75.8	
	–	–	30°	45.8	3	NTR 30.75.8	
	–	–	45°	68.7	3	NTR 45.75.8	
	–	–	60°	91.6	3	NTR 60.75.8	
	–	–	75°	114.5	3	NTR 75.75.8	
	–	–	90°	137.5	3	NTR 90.75.8	
	–	–	105°	160.4	3	NTR 105.75.8	
–	–	120°	183.3	3	NTR 120.75.8		
100	4	33	–	–	1	NTR 4.28.100.8	Price and delivery period: upon request
	10	38	–	–	1	NTR 10.36.100.8	
	20	48	–	–	1	NTR 20.46.100.8	
	–	–	15°	29.5	3	NTR 15.100.8	
	–	–	30°	58.9	3	NTR 30.100.8	
	–	–	45°	88.4	3	NTR 45.100.8	
	–	–	60°	117.8	3	NTR 60.100.8	
	–	–	75°	147.3	3	NTR 75.100.8	
	–	–	90°	176.7	3	NTR 90.100.8	
–	–	105°	206.2	3	NTR 105.100.8		
–	–	120°	235.6	3	NTR 120.100.8		
125	4	33	–	–	1	NTR 4.28.125.8	Price and delivery period: upon request
	10	38	–	–	1	NTR 10.36.125.8	
	20	48	–	–	1	NTR 20.46.125.8	
	–	–	15°	36	3	NTR 15.125.8	
	–	–	30°	72	3	NTR 30.125.8	
	–	–	45°	108	3	NTR 45.125.8	
	–	–	60°	144	3	NTR 60.125.8	
	–	–	75°	180	3	NTR 75.125.8	
	–	–	90°	216	3	NTR 90.125.8	
–	–	105°	252	3	NTR 105.125.8		
–	–	120°	288	3	NTR 120.125.8		

#### Additional ordering information

- Cam versions: see page 16
- T-slot cam drums: see page 9  
(order designation for 8 mm slot spacing NTRN 8 ... instead of NTRN 12 ... for corresponding drum diameters)
- Cams for mechanical actuation: see page 20



**Request**

Account no. : \_\_\_\_\_ Phone : \_\_\_\_\_  
Company : \_\_\_\_\_ Fax : \_\_\_\_\_  
First name / Surname : \_\_\_\_\_ Email-Adress : \_\_\_\_\_  
Street / Hausenumber : \_\_\_\_\_ Date : \_\_\_\_\_  
Country / Town / Zip : \_\_\_\_\_

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Please send us your quote for the following product(s) :

- T-slot cam semicircles     T-slot cam drums     Radial cams     Proximity radial cams

order no. *	catalogue no. *	part no. / description	Quantity
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
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<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Requested delivery date : \_\_\_\_\_

\* in our download area on [www.bremer-schaltelemente.de](http://www.bremer-schaltelemente.de), you find our product catalogue with all order- and catalogue numbers

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contact:

Phone: +49 (0)641 96 99 54 - 3, Fax: +49 (0)641 96 99 54 -4

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