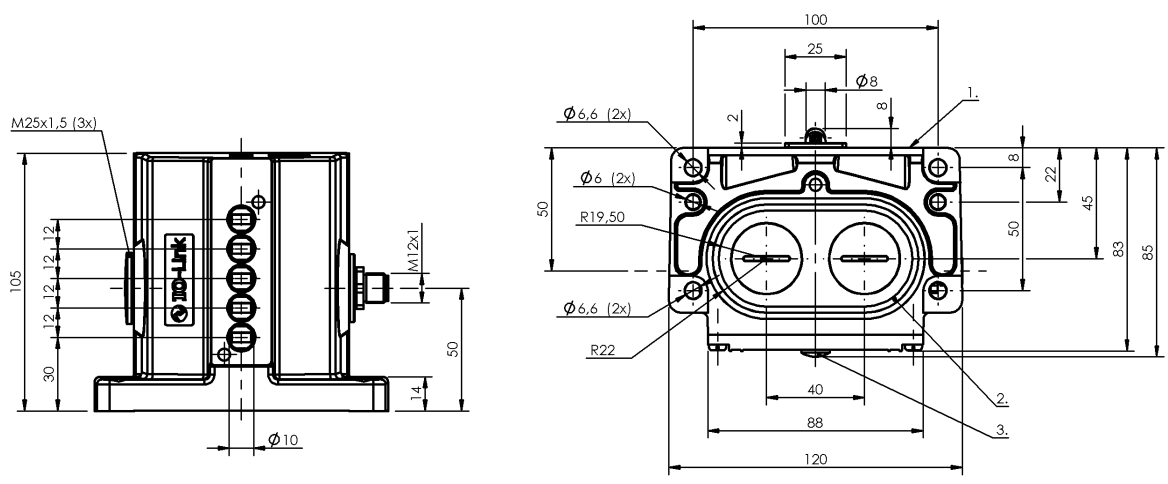


Mechanical Cam Switches  
BNS 819-D05-R12-100-10-FD-S4R-I  
Order Code: BNS053U



1) Reference edge, 2) Sealing ring, 3) Function indicator FD/FE/LL



Basic features

|                     |                                  |
|---------------------|----------------------------------|
| Approval/Conformity | CE<br>UKCA<br>WEEE               |
| Basic standard      | IEC 60947-5-1                    |
| DIN switch          | DIN 43697                        |
| Operating principle | 1-5. Switch position: Mechanical |
| Version             | Snap contact                     |

Display/Operation

|                    |                           |
|--------------------|---------------------------|
| Function indicator | 1-5. Switch position: LED |
|--------------------|---------------------------|

Electrical connection

|                 |                                   |
|-----------------|-----------------------------------|
| Connection      | M12x1-Flange male, 4-pin, A-coded |
| Connection type | 1. Switch position: Connector     |

Electrical data

|                               |                                                                                      |
|-------------------------------|--------------------------------------------------------------------------------------|
| Rated operating voltage Ue DC | 24 V                                                                                 |
| Switching function mechanical | Double-interrupting<br>galvanically isolated<br>One NO and one NC<br>Dual changeover |
| Switching rate                | 1-5. Switch position: 300/min                                                        |

Environmental conditions

|                     |            |
|---------------------|------------|
| Ambient temperature | -5...85 °C |
| IP rating           | IP67       |

Functional safety

|                       |                                    |
|-----------------------|------------------------------------|
| B10d (EN ISO 13849-1) | BSE 30.0: 30 mil. switching cycles |
|-----------------------|------------------------------------|

Interface

|                         |             |
|-------------------------|-------------|
| Cycle time min.         | 3 ms        |
| Frame type              | 2.1         |
| Interface               | IO-Link 1.1 |
| Process data cycle min. | 3 ms        |

Material

|                                      |                                              |
|--------------------------------------|----------------------------------------------|
| Housing material                     | Aluminium, Anodized                          |
| Housing material, surface protection | Anodized                                     |
| Material contacts                    | 1-5. Switch position: Silver, gold plated    |
| Plunger material                     | 1-5. Switch position: 1.4034 stainless steel |

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Mechanical data

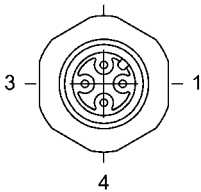
|                               |                                                    |
|-------------------------------|----------------------------------------------------|
| Approach direction            | longitudinal, parallel to attachment surface       |
| Approach speed                | 1-5. Switch position: 60 m/min                     |
| Distance cam - reference edge | 1-5. Switch position: 4.50...5.00 mm               |
| Flange, feed-through          | 2 threaded exit M25                                |
| Installation                  | Vertical                                           |
| Life expectancy mechanical    | 1-5. Switch position: 30 mil. switching operations |

|                               |                                |
|-------------------------------|--------------------------------|
| Number of switching positions | 5x Roller Mechanical           |
| Plunger style                 | 1-5. switch position: Roller   |
| Switch actuation force        | 1-5. Switch position: 20 N     |
| Switching element             | 1-5. Switch position: BSE 30.0 |

Range/Distance

|                 |                                     |
|-----------------|-------------------------------------|
| Reproducibility | 1-5. Switch position: $\pm 0.01$ mm |
|-----------------|-------------------------------------|

Connector Drawings



View of connector side

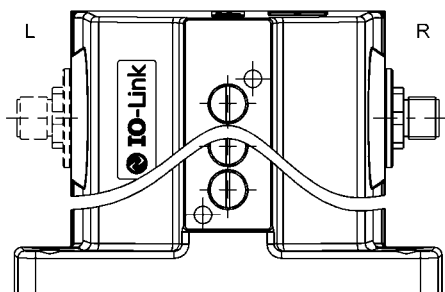
Mechanical Cam Switches

BNS 819-D05-R12-100-10-FD-S4R-I

Order Code: BNS053U

**BALLUFF**

## Wiring Diagrams



PIN 1: +24V  
PIN 3: 0V  
PIN 4: IO-Link



## Help Views

### BNS with IO-Link from 1 up to 16 positions

Frame type: 2.1

Process data length: 1 Byte

#### Process data image:

| Process data: ≤ 8 positions |           |           |           |           |           |           |           |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Byte 0                      |           |           |           |           |           |           |           |
| 7                           | 6         | 5         | 4         | 3         | 2         | 1         | 0         |
| NO / NC 8                   | NO / NC 7 | NO / NC 6 | NO / NC 5 | NO / NC 4 | NO / NC 3 | NO / NC 2 | NO / NC 1 |
| NO / NC 8                   | NO / NC 7 | NO / NC 6 | NO / NC 5 | NO / NC 4 | NO / NC 3 | NO / NC 2 | NO / NC 1 |

| Process data: > 8 positions |            |            |            |            |            |            |           |           |           |           |           |           |           |           |           |
|-----------------------------|------------|------------|------------|------------|------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Byte 0                      |            |            |            |            |            |            |           | Byte 1    |           |           |           |           |           |           |           |
| 7                           | 6          | 5          | 4          | 3          | 2          | 1          | 0         | 7         | 6         | 5         | 4         | 3         | 2         | 1         | 0         |
| NO / NC 16                  | NO / NC 15 | NO / NC 14 | NO / NC 13 | NO / NC 12 | NO / NC 11 | NO / NC 10 | NO / NC 9 | NO / NC 8 | NO / NC 7 | NO / NC 6 | NO / NC 5 | NO / NC 4 | NO / NC 3 | NO / NC 2 | NO / NC 1 |
| NO / NC 16                  | NO / NC 15 | NO / NC 14 | NO / NC 13 | NO / NC 12 | NO / NC 11 | NO / NC 10 | NO / NC 9 | NO / NC 8 | NO / NC 7 | NO / NC 6 | NO / NC 5 | NO / NC 4 | NO / NC 3 | NO / NC 2 | NO / NC 1 |

#### On-request data:

|                     | DPP                    | SPDU  |           | Object name       | Length                 | Range                                          | Default value                    |
|---------------------|------------------------|-------|-----------|-------------------|------------------------|------------------------------------------------|----------------------------------|
|                     | Index                  | Index | Sub-Index |                   |                        |                                                |                                  |
| Identification Data | 0x07                   |       |           | Vendor ID         | 2 Byte                 | read only                                      | 0x0378                           |
|                     | 0x08                   |       |           | Decice ID         | 3 Byte                 |                                                | 0x01010X<br>X = No. of positions |
|                     | 0x09                   |       |           |                   |                        |                                                |                                  |
|                     | 0x0A                   |       |           |                   |                        |                                                |                                  |
|                     | 0x0B                   |       |           |                   |                        |                                                |                                  |
|                     |                        | 0x10  | 0         | Vendor name       | 7 Byte                 |                                                | BALLUFF                          |
|                     |                        | 0x11  | 0         | Vendor text       | 15 Byte                |                                                | www.balluff.com                  |
|                     |                        | 0x12  | 0         | Product name      | 31 Byte                |                                                | BNS 819-xxx-xxx-xx-S4x-I         |
|                     |                        | 0x13  | 0         | Product ID        | 7 Byte                 |                                                | BNSxxxx                          |
|                     |                        | 0x14  | 0         | Product text      | 10 / 11 Byte           |                                                | BNS xx-fach                      |
|                     |                        | 0x16  | 0         | Hardware Revision | 2 Byte                 |                                                |                                  |
|                     |                        | 0x17  | 0         | Firmware Revision | 2 Byte                 |                                                |                                  |
| Programmable Data   |                        | 0x40  | 0         | NO / NC           | ≤ 8 positions = 1 Byte | 0x00 - (2^positions)-1<br>(1 Bit = 1 position) | "0"                              |
|                     | > 8 positions = 2 Byte |       |           |                   |                        |                                                |                                  |
|                     |                        |       | 1 - 16    |                   | 1 Byte                 | "0" Not inverted<br>"1" inverted               |                                  |

#### Errors:

| Class       |       |          | Error Code               | Additional Code         |
|-------------|-------|----------|--------------------------|-------------------------|
| Mode        | Type  | Instance |                          |                         |
| single shot | Error | AL       | Device application error | Index not available     |
|             |       |          |                          |                         |
|             |       |          |                          |                         |
|             |       |          | 0x40                     | 0x30                    |
|             |       |          | 0x03                     | 0x03                    |
|             |       |          | 0x80                     | 0x11                    |
|             |       |          | 0x73                     | 0x80                    |
|             |       |          | 0x80                     | 0x11                    |
| single shot | Error | AL       | Device application error | Sub-Index not available |
|             |       |          |                          |                         |
|             |       |          |                          |                         |
|             |       |          | 0x40                     | 0x30                    |
|             |       |          | 0x03                     | 0x03                    |
|             |       |          | 0x80                     | 0x12                    |
|             |       |          | 0x73                     | 0x80                    |
|             |       |          | 0x80                     | 0x12                    |

#### Input data: No input data available