

R38 Series: Ergonomic Desktop Trackball Module, USB



Figure 1: R38 Desktop Trackball

1. DESCRIPTION

The R38 Series desktop trackball module is an ambidextrous, high specification device that incorporates the latest Cursor Controls Ltd capacitive/touch technology.

The module combines the patented optical trackball technology with a capacitive, Z-axis scrolling ring allowing vertical and horizontal scrolling.

To compliment these two technologies, the module also includes left, middle, right, forward, and backward buttons and a resolution button allowing the user to select from five resolution configurations. The user can also switch easily between left and right-hand configurations via a designated button.

The solid-state design prevents entry of dust and dirt, allowing easy cleaning of the trackball area once the ball is removed.

The unit has been designed to be a freestanding desktop device and optimises desk space when compared to a mouse.

2. REFERENCE DOCUMENTS

- [1] IEC/EN 62368-1:2014
- [2] IEC/EN 55032:2015
- [3] IEC/EN 55035:2017
- [4] FCC CFR 47, Part 15.107
- [5] FCC CFR 47, Part 15.109
- [6] ICES-003 RSS-GEN, Issue 5
- [7] IEC/EN 6100-4-2:2009

3. FEATURES

The R38 desktop trackball incorporates the following features:

- Infra-red optical navigation technology.
- Integrated left, middle, right, forward, and backward switch functionality.
- 38mm ball for precise cursor control.
- Horizontal and vertical Z-axis scrolling.
 - 2 x Z-axis scrolling modes (linear and continuous), selectable via a single dedicated button – see Section 5 for details.
- 5 x resolution configurations, selectable via a single dedicated button – see Section 5 for details.
 - High and low toggle modes within each resolution configuration – see Section 5 for details.
- Left and right handedness configurations, selectable via a single dedicated button – see Section 5 for details.
- USB output.
- Wired USB cable providing high reliability and avoiding the need for batteries.

The R38 Series desktop trackball provides conventional X and Y axis cursor movement with an additional capacitive Z-axis scrolling ring. The Z-axis scrolling ring provides scroll and zoom capabilities for more effective navigation (please note that the function of the scrolling ring is software dependent).

The trackball also features a removable ball, allowing servicing, cleaning, and maintenance.

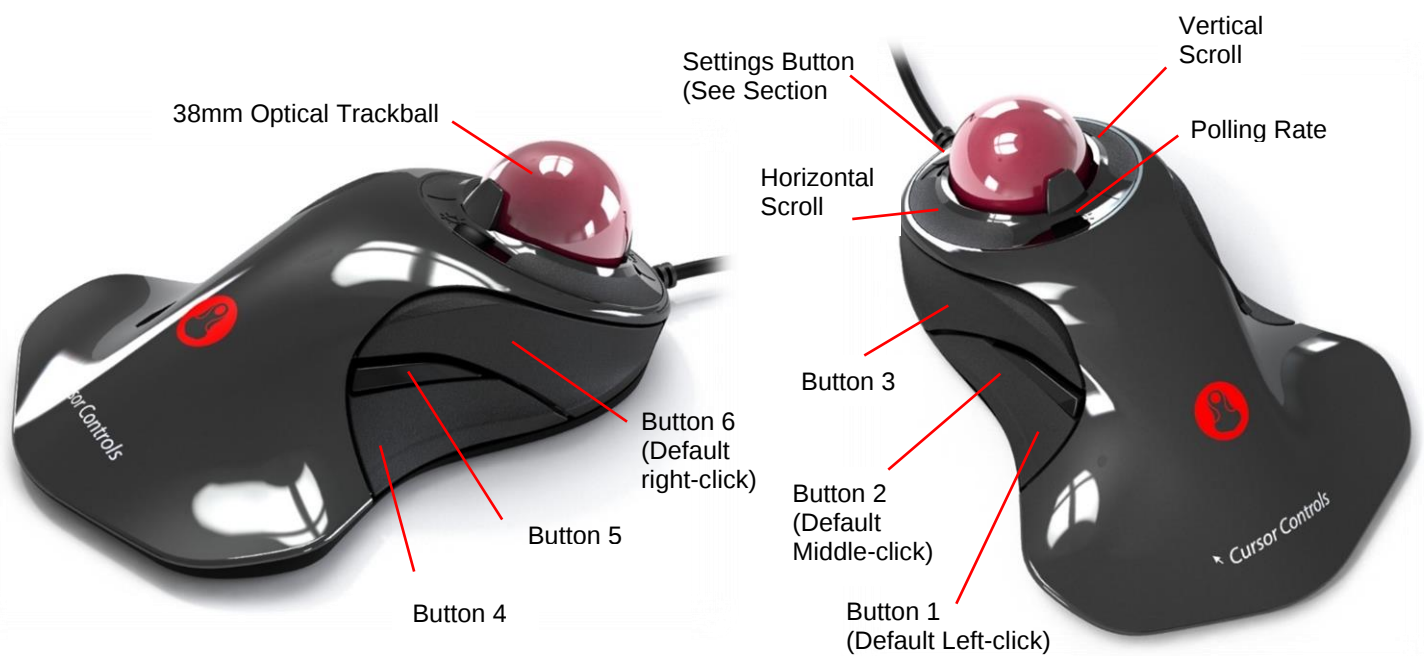


Figure 2: R38 Desktop Trackball Features*

*Note: The above illustration shows button assignments for right-hand mode. Button and scrolling assignments for left-hand mode are the reverse of those shown here.

4. SPECIFICATIONS

4.1 MECHANICAL		
Module		
4.1.1	Weight	~230 grams
4.1.2	Housing material	ABS 758
4.1.3	Housing colour/finish	Metallic Grey
4.1.4	Base plate material	ABS: Magnum 3416 SC
4.1.5	Base plate colour/finish	Black, MT11010 spark finish
4.1.6	Button material	ABS: Magnum 3416 SC
4.1.7	Button colour/finish	Buttons 1, 3, 4 and 6: Black, MT11010 spark finish
		Buttons 2 and 5: Black, A-2 polished finish
4.1.8	Scrolling ring material	Polycarbonate: Lexan ML6411
4.1.9	Scrolling ring colour/finish	Black, A-2 polished finish with MT11010 spark finish applied to scrolling areas
4.1.10	Mounting position	Desktop use only
Trackball Assembly		
4.1.11	Ball size/material	Ø38.1mm (1.5"), Epoxy resin
4.1.12	Ball tracking force	3 - 10 grams
4.1.13	Ball load	100N (10Kg) maximum downward pressure for 2 minutes @ 20°C
4.1.14	Resolvable ball speed	30 IPS (inches per second)
4.1.15	Tracking engine	Infra-red optical navigation technology
Switches		
4.1.16	Switch type	Omron D2LS-11
4.1.17	Switch actuation force	100 ± 50 grams force
4.1.18	Switch mechanical life	5,000,000 cycles

4.2 ELECTRICAL		
4.2.1	Protocol	USB
4.2.2	Supply voltage	4.4V to 5.25V DC
4.2.3	Supply current	100mA max.
4.2.4	Trackball resolution	Refer to Section 5.1 (below) for details
4.2.5	Output connector	USB "A" type connector with 2 metre cable
4.2.6	Mating connector	Standard USB "A" type socket

4.3 ENVIRONMENTAL		
4.3.1	Safety	Compliant with European requirements in accordance with IEC/EN 62368-1:2014 [1]
4.3.2	Mechanical lifetime	1 million ball revolutions
4.3.3	EMC	Emissions in accordance with: IEC/EN 55032:2015 [2] FCC CFR 47, Part 15.109 [5] ICES-003 RSS-GEN, Issue 5 [6] Immunity in accordance with: IEC/EN 55035:2017 [3] FCC CFR 47, Part 15.107 [4] ICES-003 RSS-GEN, Issue 5 [6]
4.3.4	ESD	8kV air-discharge, 4kV contact discharge in accordance with IEC/EN 6100-4-2:2009 [7]
4.3.5	IP sealing capability	IP40

4.4 ELECTRICAL OUTPUT COMPATIBILITY

Windows 10, 8.1, 8, 7

Mac OS X, versions 10.8 or later

Linux, CentOS 7, Ubuntu 19.04 LTS

Android 5 or later

Fully compliant with USB 2.0 (Low Speed) framework (chapter 9) and HID specifications

5. R38 SETTINGS AND CONFIGURATIONS

Setting and configuration options for the R38 trackball are included below. For additional user instructions, guidelines, troubleshooting and general maintenance, please refer to document MKT014 – Operating Instructions.

5.1 Resolution Mode Button

Pressing and holding the Resolution Mode button for 3 seconds changes the resolution configuration, allowing the user to select from 5 configuration options (holding the button down for longer cycles through the settings until released). Within each resolution configuration, a single/momentary button press allows the user to toggle between high and low modes.

The table below shows available resolution configurations.

LEDs	High Mode	Low (Sniper) Mode
1 Blink	400 CPI	130 CPI
2 Blinks	800 CPI – Factory Default	260 CPI
3 Blinks	1200 CPI	400 CPI
4 Blinks	2000 CPI	665 CPI
5 Blinks	3000 CPI	1000 CPI

Table 1: Resolution Settings

After 5 seconds of activation, the current setting is saved into memory and will be restored if a reset event occurs.

5.2 Settings Mode Button



Figure 3: Settings Mode Button

The Settings Mode button is used for two functions.

1. To toggle between continuous and linear scrolling modes
2. To toggle between left and right handedness modes.

Scrolling Modes

A single, momentary press of the Settings Mode button is used to toggle between continuous and linear scrolling modes. This is indicated by the LEDs as shown below.

LEDs	Scrolling Mode
1 Blink	Continuous Scroll Mode – Factory Default
2 Blinks	Linear Scroll Mode

Table 2: Scrolling Modes

The scrolling modes operate as follows.

- Continuous Scroll Mode:
 - Touching and dragging in the scrolling area causes continuous scrolling that is maintained until the user removes their finger.
 - Scrolling speed is determined by how far the user moves their finger relative to the initial point of contact, i.e.: moving further away from the initial point of contact results in faster scrolling.
- Linear Scroll Mode:
 - Speed and scrolling motion are directly determined by finger movement within the scrolling area. Scrolling occurs when the user moves their finger and stops when the finger stops moving.
 - Scrolling speed is directly governed by the speed at which the user moves their finger.

After 5 seconds of activation, the current setting is saved into memory and will be restored if a reset event occurs.

Scrolling output (for both modes) is shown below.



Figure 4: Scrolling Output**

**Please note: The above illustration reflects scrolling assignments for right-hand mode. Vertical and horizontal scroll areas are switched for left-hand mode; however, the scrolling directions remain as shown above, i.e.: for both left and right-handed configurations, moving the finger in a forwards direction produces scrolling motion upwards and to the right.

Handedness Modes

Pressing and holding the Settings Mode button for 3 seconds toggles between right and left-hand modes. This is indicated by the LEDs as shown below.

LEDs	Handedness Modes
1 Blink	Right-hand mode – Factory Default
2 Blinks	Left-hand mode

Table 3: Handedness Settings

5.3 Lighting Mode Button



Figure 5: Lighting Mode Button

The Lighting Mode button allows selection of the desired lighting scheme. Each single/momentary button press causes the RGB output to change, with repeated presses allowing the user to cycle through all 12 lighting settings in the sequence shown below.

1. Chameleon (Factory Default)
2. White
3. Red
4. Orange
5. Yellow
6. Green
7. Cyan
8. Light Blue
9. Blue
10. Purple
11. Pink
12. Off

After 5 seconds of activation, the current setting is saved into memory and will be restored if a reset event occurs.

5.4 Button Configuration

Left/Backward Buttons

The left and backward button functions can be swapped by holding both buttons simultaneously for 5 seconds.



Figure 6: Left/Backward Button Configuration***

***Note: The above illustration shows button assignments for right-hand mode. Button assignments for left-hand mode are the reverse of those shown here.

Button configuration is indicated by the device's LEDs as shown below.

LEDs	Button Configuration
1 Blink	Button 'A' = Left – Factory Default Button 'B' = Backward – Factory Default
2 Blinks	Button 'A' = Backward Button 'B' = Left

Table 4: Left/Backward Configuration Modes

After 5 seconds of activation, the current setting is saved into memory and will be restored if a reset event occurs.

Right/Forward Buttons

The right and forward button functions can be swapped by holding both buttons simultaneously for 5 seconds.



Figure 7: Right/Forward Button Configuration***

***Note: The above illustration shows button assignments for right-hand mode. Button assignments for left-hand mode are the reverse of those shown here.

Button configuration is indicated by the device's LEDs as shown below.

LEDs	Button Configuration
1 Blink	Button 'A' = Forward – Factory Default Button 'B' = Right – Factory Default
2 Blinks	Button 'A' = Right Button 'B' = Forward

Table 5: Right/Forward Configuration Modes

After 5 seconds of activation, the current setting is saved into memory and will be restored if a reset event occurs.

5.6 Touch Filter

The touch filter, used to prevent unwanted ball motion when scrolling (and vice versa), can be turned off/on by simultaneously holding the middle buttons on both sides of the device for 5 seconds.

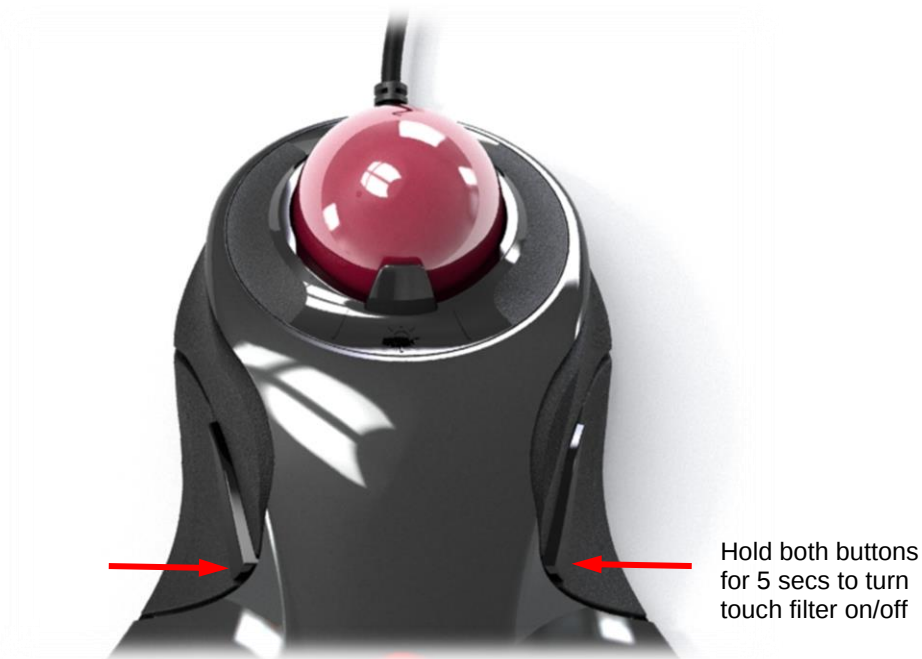


Figure 8: Touch Filter Modes

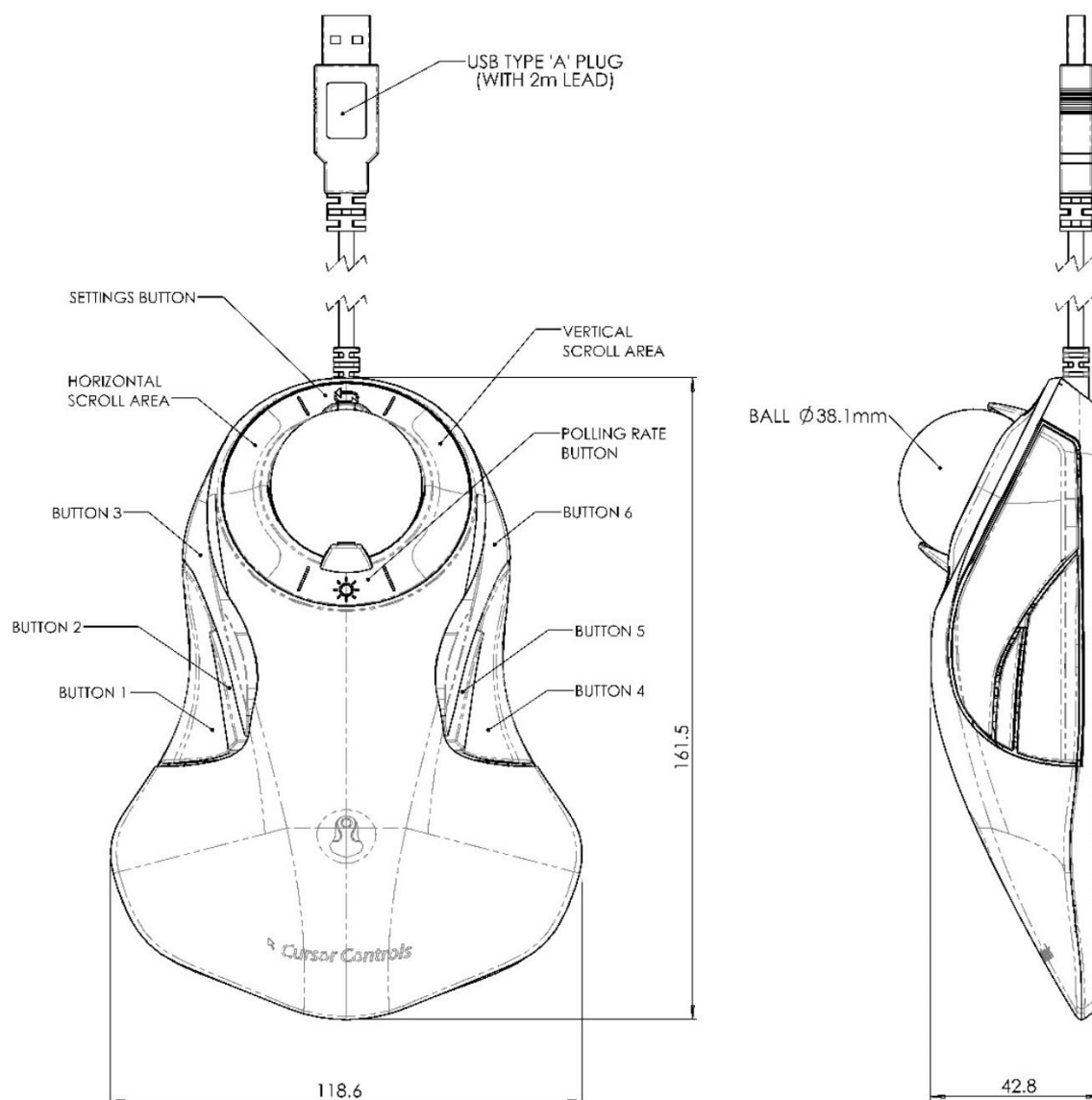
Touch filter status is indicated by the device's LEDs as shown below.

LEDs	Touch Filter
1 Blink	Filter active – Factory Default
2 Blinks	Filter deactivated

Table 6: Touch Filter Modes

After 5 seconds, the current setting is saved into memory and will be restored if a reset event occurs.

6. DIMENSION DRAWING



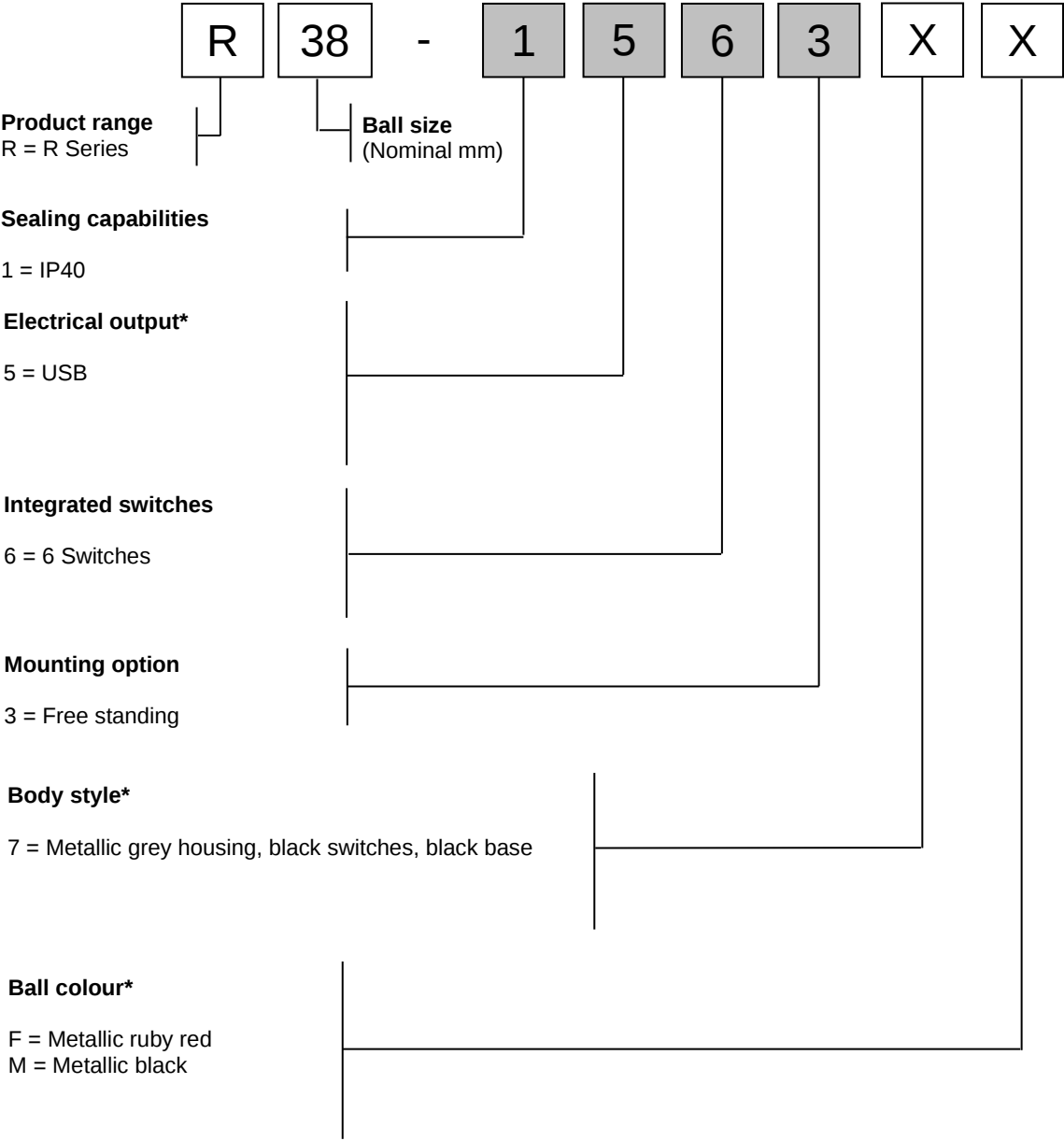
All dimensions are in mm unless otherwise stated.

Tolerances +/- 0.25mm unless otherwise stated.

Please note that an IGES/STEP model is available on request. Please contact your local sales office for more

7. PRODUCT ORDERING CODE SYSTEM

Please construct your standard product ordering code by selecting the numbers and letters to suit your specification:



*Further options are available - please contact your local sales representative

6.1 Ordering Example

R38-15637F: R38 Series Desktop Module, IP40, USB, 6 switches, free standing, Metallic grey housing, black switches, black base, metallic ruby red ball.

8. CUSTOMISATION

Elements of the R38 trackball can be customised to your requirements. Options include custom colours (ball, switches, body) and the addition of custom logos/ branding.

Please contact your local sales representative to discuss customisation / branding options.



9. DOCUMENT HISTORY

Issue	Date	Author	Remarks
01	01.07.24	R.D.	Draft release – NP1453
02	12.07.24	R.D.	Document Released
03	22.07.24	R.D	'8' removed from ordering code. Customisation section added