



# **Operation Manual**

## Bolt-Check BoltTrack

R&D Test Systems A/S

Rev. date. 12-12-2024

| Name:<br>Bolt-Check Bolt | Track Manual |              |              | BOIT    |
|--------------------------|--------------|--------------|--------------|---------|
| Date:                    | Rev.:        | Document no: | Approved by: |         |
| 12-12-2024               | 01           | 0001-415-MAN | JAS          | V-CHECK |

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## 1 Document Revision Table

| Rev. no.: | Rev. Date: | Change:       | Responsible |
|-----------|------------|---------------|-------------|
| 01        | 12-12-2024 | First edition | JAS         |
|           |            |               |             |
|           |            |               |             |
|           |            |               |             |
|           |            |               |             |
|           |            |               |             |

### 2 Introduction

#### 2.1 Purpose

The purpose of this manual is to describe the usability of the Bolt-Check BoltTrack and secure safe and correct use of the platform.

BoltTrack is a web interface serving as a management platform to evaluate data, change targets, spring constants, and manage roles or sites.

#### 2.2 Customer support

R&D maintains a customer support, capable of assistance regarding questions not covered in this operation manual. Customer support can be reached via the following contact information.

#### Customer support

R&D Test Systems A/S Sigma 3 8382 Hinnerup Denmark Mail: service@rdas.dk Phone: +45 28 51 89 50



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#### 2.3 Disclaimer

This manual should be read and understood prior to use. Lack of understanding can lead to wrong creation or editing of data, resulting in false analysis of elongation data.

This manual only covers the Bolt-Check BoltTrack.

To download additional manuals in relation to Bolt-Check components, browse to:

https://rdtestsystems.com/bolt-check/manuals/

#### 2.4 Scope

The Bolt-Check BoltTrack is, amongst other things, designed to:

- Present elongation measurements performed with a Bolt-Check devices
- Provide access to the measurements
- Define or change joint specific acceptance criteria and material constants
- Administrate users
- Provide a backup of the data

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## **3 Getting Started**

#### 3.1 New User

To create a new user, contact your company administrator. User credentials consist of an e-mail and a password. Passwords can be temporary and later reset to a personal password by the new user.

#### 3.2 Navigation

- Top right corner the user logged in is shown. (1)
- Top left corner besides Bolt-Check logo contains access to: (2)
  - Dashboard
  - Your Sites
  - Admin
- "Your sites" can be navigated from "Dashboard". (3)



#### 3.2.1 Dashboard

• From "Dashboard" there is an overview of all "Your Sites", if any warnings or alerts are present, these will be displayed here. Contains number of total turbines on every site.



| ≡                             |   |                                |                                 | MG MKG |
|-------------------------------|---|--------------------------------|---------------------------------|--------|
| Home / Dashboard              |   |                                |                                 |        |
| Your sites                    |   |                                |                                 |        |
| Your sites                    | Warnings                                    | Alerts                         | Number of turbines              |        |
| Your sites<br>TEST SITE       | Warnings<br>0                               | (Alerts)<br>0                  | Number of turbines              |        |
| Your sites TEST SITE JES site | Warning:         0.           0.         0. | Aleres           0           0 | Number of turbines<br>20<br>245 |        |



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#### 3.2.2 Your Sites

#### To access a site:

- Press on the desired "Site". (1)
- Filters make for easy search on the desired specifications: (2)
  - Project
  - Group Name
  - Turbine ID
  - Rotor Size
  - Power Rating
  - Mark
  - Due Date
- On the right-hand side of the filters, there are different options to sort how to view such as: (3)
  - Show/Hide filters
  - Show/Hide columns
    - Under "Show/Hide columns" there is an option to select which column to hide.
  - Toggle density
  - Toggle full screen

#### 3.3 Viewing Data

- Find the desired project and press on "View Group". (1)
- From here there's an overview over all bolts in project.
- The overview shows: (2)
  - Last measurement (Day/Month/Year)
  - Measurement [kN] (Current)
  - Measurement [mm] (Current)
- Press the arrow (3) to get more details on performed measurements.









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## 4 Data Editing

For making the first data or editing:

- Go to the desired project and press "Edit" (1)
- From there a window opens with options to set:
  - kN Min Pre-tension Force
  - kN Max Pre-tension Force
  - Min Char. Pre-tension Force
  - Bolt linear relationship [kN/mm]
  - Description
- When everything is set to the desired specifications press "Update"
- In top right corner there is an option to export projects data as a CSV file for excel.

| DUL     | 12   |  |  |   |  |
|---------|--|--|--|---|--|
| ♦ CHECK | 2  |  |  |   |  |
|         | ecma.  |  |  |   |  |
|         | Project  |  |  |   |  |
|         | . Tojeci   |  |  |   | Children (Children (Childr |
|         | Group  |  |  |   |  |
|         | fance hoot   | e e e e e e e e e e e e e e e e e e e  |  |   |  |
|         | Street state   | COLUMN TO A  |  |   |  |
|         |  |  |  |   |  |
|         |  | kN Min Pretension Foose  | kN Max Pretension Force  | Min Char. Pretension Force  | Bolt linear relationship khi mm  |
|         | 612  | 2509   | 2762   | 0   | 1751.2   |
|         |  |  |  |   |  |
|         |  |  |  |   |  |
|         | Bolts  | 1  |  |   |  |
|         | Bolts  | 1<br>1   | anară.   | Massurement (MR)  | Massarement (mm)   |
|         | Bolts  | 1<br>t / Last measur<br>c1 00.50/ 2021   | 1011   | Macaurement (649)<br>2012 28:   | Maazerement (mm)   |
|         | Bolts  | 1<br>1 Unit menour<br>1 OF APP 2024<br>(* 011402-2024  | met  | Massarement (KN)<br>2002 28-<br>293 1997  | Measurement (word)<br>149  |
|         | Bolts<br>and<br>an and<br>an and<br>an and<br>an and   | 1<br>4 <b>Last measur</b><br>1 00 Apr 2021<br>(2 01 Apr 2024<br>12 04 Apr 2024                                     | eneet ()<br>1834 ()<br>1865 ()<br>1864 ()  | Massumment (MR)<br>202255<br>203105<br>273185   | Measurement (incr)<br>149<br>158   |
|         | Bolts<br>Be<br>A Be<br>A Be<br>A Be<br>A Be  | 1<br>1 00 A9 2001<br>1 00 A9 2001                  | enerat ()<br>1834 ()<br>1836<br>1837<br>1830   | Massarement (AN)<br>20223<br>20230<br>20230<br>20230<br>20230   | Management (mm)<br>149<br>149<br>146<br>146  |
|         | Bolts<br>Be<br>A Be<br>A Be<br>A Be<br>A Be<br>A Be<br>A Be  | 1<br>57<br>1 00 Apr 2005<br>10 00 Apr 2005<br>10 00 Apr 2004<br>11 00 Apr 2004<br>12 00 Apr 2004<br>15 00 Apr 2004 | 1144 (1)<br>124 (2)<br>125<br>1250 (2)<br>1247 (2)<br>1247 (2)                       | Masseement (AN)<br>20228<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>-0.139<br>- | Management (and<br>549<br>545<br>545<br>545<br>545<br>546  |
|         | Bolts<br>Bel<br>A Bel<br>A Be | 1 50 Apr 2005  | 2004<br>2015<br>2015<br>2017<br>2017<br>2017<br>2017<br>2017<br>2017<br>2017<br>2017 | Massawani (AN)<br>2012 28<br>2013 28<br>2013 29<br>2013 20<br>2013 20<br>2013 20<br>2013 20<br>2014 20<br>2015 20<br>2015 20<br>2016 20<br>2016 20<br>2016 20<br>2016 20<br>2017 20  | Masurenet(me)<br>10<br>14<br>15<br>15<br>15<br>16<br>15<br>16<br>23  |

| fange boots                           | × |
|---------------------------------------|---|
| kN Min Pretension Force 2300          |   |
| kN Max Pretension Force 2762          |   |
| Min Char. Pretension Force 0          |   |
| Bolt liniar relationship kN mm 1751.2 |   |
| Description Description               |   |
| Updat                                 | e |



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## 5 Admin Features

#### 5.1 Users

- Pressing on "Users" gives an overview over all users. (1)
- From here the option to "Create user" is located. (2)
- After pressing "Create user" a window will appear with boxes to fill out: (3)
  - Name
  - Username
  - Email
  - Password
  - (Can be reset later)
  - Select Roles
  - (Can be changed later)
- Press "Create" to finish new user creation

#### 5.1.1 Edit Users

- By pressing on the user needing to be edited, a menu will appear. Details to change:
  - Name
  - Email
  - Username
  - Roles
  - Go to "5.1.2 Edit Roles" for more.
  - Reset password
  - Delete user
  - Create offline access
- Press "Reset password" and follow the instruction, type (reset) press "Reset".
- After an email with reset password link, will be sent to the person's email.



| 0 Jesper Stokbæk jestjördas.dk | 01-01-0001 00:00:00 01-01-000 | 1 01-01-0001 (Addies)  |
|--------------------------------|-------------------------------|--|
| Rediger bruger                 | Roles                         |  |
| Name                           | Admin *                       | 10   |
| Jesper Stoktxek 🗸              |                               |  |
| Email                          |                               | Reset password 🔎   |
| jes@rdas.dk 🗸                  |                               | and the second |
| Username                       |                               | Delete user  |
| Username 0                     | Offline user                  | Create offline access 🕅  |
| Submit                         | Login                         | Name   |
|                                | Jesper Stokbaek               | Jesper Stokbæk   |
|                                | 105                           | JES  |





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- To create offline access press on "Create offline access" type name and username and press "Create".
- To delete user the same method as "Reset password" is used. Press "Delete user" and type (delete) press "Delete".

| Create offline access | ×            |
|-----------------------|--------------|
| Name                  |              |
| Name                  | ✓            |
| User Name             |              |
| Login                 | ✓            |
| Create 🔄 Reset form   | Close Create |

#### 5.1.2 Edit Roles

• Press the highlighted arrow to get a menu with the roles. Now select the specific role to assign them, this step needs to be repeated if more than one role is required.

Admin

- Admin rights to all existing sites, and/or created by themselves
- Can give access to other admins to their sites (and assign to role below in hierarchy)
- Back-office engineer (product manager etc.)
  - Must be given site access by higher role in hierarchy
  - Can not assign site access to anyone
- Measurement Manager
  - Must be given site access by higher role in hierarchy
  - Can assign site access to techs (lower in hierarchy)

Tech

- Must be given site access by higher role in hierarchy



|                      | BC Cloud        |            |                          |                    |                        |
|----------------------|-----------------|------------|--------------------------|--------------------|------------------------|
| Role                 | Use BC Standard | View sites | Assign user<br>to a site | Create<br>new site | Create<br>new<br>users |
| Admin                | х               | х          | х                        | Х                  | Х                      |
| Measurement Manage   | Х               | х          | Х                        |                    |                        |
| Back Office Engineer | Х               | х          |                          |                    |                        |
| Tech                 | Х               |            |                          |                    |                        |



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#### 5.2 Sites

From here there is an overview over all sites assigned to the user. The list includes:

- Name of the sites
- Users on the sites
- To create a new site, press "Create site". (1)
- Type the site name and press "Create site". If the box "Cloud only" is pressed, the site cannot be synced down onto Bolt-check standard. (2)

"Cloud only" can be put on or taken off later.

- The new site will appear in the bottom of the list of sites.
- Press on the site as shown in the picture. (3)
- A menu will appear, from here "Cloud only" can be put on or off. Site settings can be put on to give warnings and alerts.

Users can also be assigned to the site from here. (4)

 If site needs to be deleted, press "Delete site" a window will appear. type "delete" and press on delete.





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#### 5.3 Maintenance

- Type in sites, projects, etc. to sort the list of flanges available for selection
- Press and select desired site/project/group (1)
- Set: (2)
  - Min char [kN]
  - Min [kN]
  - Max [kN]

This is used for easy mass setting

- "Min Pre-tension Force" can be set after the specific task.
   Minimum Pre-tension Force is set to know when to retighten.
- "Max Pre-tension Force" can also be set after the specific task. Maximum Pre-tension Force is set to know when somethings wrong.
- "Min Char. Pre-tension Force". μ – Kn. σ
   μ: Mean of sample
   Kn: Coefficient from table
   σ: Sample standard deviation

| 1000       |   | nar K  | Min  | KIN MAX   | ĸN   | Summi   | -                                   |
|------------|---|--|--|---|--|---|-------------------------------------|
| 141-1      | 3 of 7  | 55 row(s) selected   |  |   |  |   |                                     |
|            |   | Site  <br>Filler by Site 📏   | Project  <br>  Filler by Project. ×  | Group Name 🚦<br>Filler by Grou 🗙  | Turbine Id 🕴<br>Filter by Turbi_ 🗙   | Rotor Size 🕴<br>Filter by Rotor 🗙                             | Power ratio                         |
| 5          |   | TEST SITE  | VM MP-TP 07  | Level 1   |  |   |                                     |
| 8          |   | TEST SITE  | VM MP+TP 66  | Level 1   |  |   |                                     |
| enance     | 2   | TEST SITE  | n  | 13  |  |   |                                     |
|            |   | TEST SITE  | n  | 12  |  |   |                                     |
| -          |   | TEST SITE  | n  | п   |  |   |                                     |
|            |   | TEST SITE  | 11   | top   |  |   |                                     |
|            |   | TEST SITE  | VM MP-TP 33  | Level 1   |  |   |                                     |
|            |   | TEST SITE  | TurbineB 164 4,2 4b  | Section1  | TurbineB   | 164   | 4,2                                 |
|            |   | TEST SITE  | TurbineB 164 4,2 4b  | Tower   | TurbineB   | 164   | 4,2                                 |
|            |   | TEST SITE  | TurbineB 164 4,2 4b  | Section1  | TurbineB   | 164   | 4,2                                 |
| 5          |   | TEST SITE  | VM MP-TP 01  | Level 1   |  |   |                                     |
| Pretension | whe   | re:  |  |   |  |   |                                     |
| Pretension | whei<br>μ:π<br><u>k</u> .:c<br>σ:s  | re:<br>nean of samp<br>coefficient froi<br>ample standa<br>umber of mea  | le<br>m Table 13-1<br>ard deviation<br>asurements in s   | ample   |  |   |                                     |
| Pretension | when<br><u>u</u> : m<br><u>k</u> <u></u> : c<br><u>o</u> : s<br><u>n</u> : n      | re:<br>nean of samp<br>coefficient froi<br>ample standa<br>umber of mea  | le<br>m Table 13-1<br>ard deviation<br>asurements in s   | ample   |  |   | T                                   |
| Pretension | when<br>μ: n<br><u>k</u> : c<br>σ: s<br><u>n:</u> n                               | re:<br>nean of samp<br>coefficient froi<br>ample standa<br>umber of mea  | le<br>m Table 13-1<br>ard deviation<br>asurements in s   | ample   | 8 10   | 20 30   | 00                                  |
| Pretension | when<br><u>µ</u> :n<br><u>ko</u> :α<br><u>σ</u> :s<br><u>n</u> :n                 | re:<br>nean of samp<br>coefficient froi<br>ample standa<br>umber of mean<br>n 3<br>ko 3.3<br>Table 13-1: Va  | le<br>m Table 13-1<br>ard deviation<br>asurements in s<br>3 4 5<br>37 2.63 2.3<br>alue for the k. for th   | ample<br>5 6 33 2.18 2<br>e 5% characteristi  | 8 10<br>2.00 1.92  | 20 30<br>1.76 1.73<br>1EN 1990:2002+A                         | ∞<br>1.64<br>1:2005 (E              |
| Pretension | when<br><u>µ</u> :n<br><u>ko</u> :c<br><u>σ</u> :s<br><u>n</u> :n<br><u>ko</u> ,d | re:<br>nean of samp<br>coefficient froi<br>ample standa<br>umber of me:<br><b>n</b> 3.<br><b>k</b> o 3.3<br>Table 13-1: Va<br>values of n n<br>lepending on<br>• for 3 < n   | le<br>m Table 13-1<br>ard deviation<br>asurements in s<br>3 4 5<br>37 2.63 2.1<br>alue for the $l_{\infty}$ for th<br>ot available in Tc<br>n value of intere<br>< 30.<br>, ( $n_2$                | ample           5         6           33         2.18         2           e 5% characteristi         able 13-1, the f           able 13-1, the f         sst:         - |  | 20 30<br>1.76 1.73<br>EN 1990:2002+A<br>vach can be use<br>1) | ∞<br>1.64<br>1:2005 (E<br>ed for ob |
| Pretension | when<br><u>µ</u> :n<br><u>ka</u> :c<br><u>σ</u> :s<br><u>n</u> :n<br><u>ka</u> ,d | re:<br>hean of samp<br>coefficient froi<br>ample standa<br>umber of mea<br>magnetic<br>the standa<br>umber of mea<br>magnetic<br>the standa<br>the | le<br>m Table 13-1<br>ard deviation<br>asurements in s<br>$3 4 4 \xi$<br>37 2.63 2.2<br>alue for the k, for th<br>bot available in Ta<br>r value of intere<br>< 30.<br>$k_n = \frac{(n_2)}{(n_2)}$ | ample<br>5 6<br>33 2.18 2<br>6 5% characteristic<br>able 13-1, the form<br>rest:<br>$\frac{-n}{-n_1} \cdot k_{n1}$  | $\frac{8}{2.00} \frac{1}{1.92}$ ic value, based or<br>following approximation in the second seco | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$         | ∞<br>1.64<br>1:2005 (E<br>ed for ob |



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| Date:                     | Rev.:       | Document no: | Approved by: |         |
| 12-12-2024                | 01          | 0001-415-MAN | JAS          | V-CHECK |

## **6** References

Ref [1] 0001-407-MAN-Bolt-Check 3 Operation Manual rev. 01

