Drive & Control Academy
DS4NA Fluid Power Training System

New: simplified model
coding and ordering
The data specified herein only serves to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of their own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

© This document, as well as the data, specifications and other information set forth in it, are the exclusive property of Bosch Rexroth AG. It may not be reproduced or given to third parties without its consent.
Drive & Control Academy

Knowledge – the decisive competitive advantage
Bosch Rexroth is one of the global leading specialists in drive and control technology and has unique technological know-how. This knowledge is passed on by the Drive & Control Academy and supports the customized training and further development as well as the qualification of technical experts.

**Knowledge is everything**
Technical knowledge and competence of its employees provides a company with a decisive advantage in global competition. Under the umbrella of the Drive & Control Academy, Rexroth offers an extensive portfolio of products in the area of drive and control technologies knowledge transfer. These products are continuously updated to follow industry standards and best practices. The Drive & Control Academy are specialists in the transfer of specialized and integrated know-how for customers and employees and are able to provide training hardware for all levels of learning. With regards to this, our product portfolio has been developed with the following points in mind:

- Practical equipment focusing on the latest state of the art technology
- Training targeted towards specific user requirements
- Training utilizing the most up to date methods

**Training**
New training offerings and continuous improvement of the training seminars guarantee that the conveyed knowledge is always state of the art. The methodical scope of supply comprises instructor led training, eLearning, practical training and blended learning. Additionally the advantages of both instructor led training and eLearning can be combined for an extremely effective training solution. When training customers we believe that the customer proximity principle is paramount.

**Training systems**
The training systems provide newcomers and advanced users with practical hands on learning in the areas hydraulics, pneumatics, electric drive and control technology, mechatronics and automation. These systems comprise standard industrial components and follow internationally standardized programming languages with open interfaces.

**Media**
Rexroth’s software-based teaching and study media are distinguished by their technical accuracy and are specifically targeted to the training seminars and training systems.

They comprise eLearning modules, technology and application trainers, animations of components and systems as well as simulation-supported training units.

This is completed by dictionaries, specialist books, manuals for trainers and trainees as well as for work equipment.

**Knowledge Portal**
The Knowledge Portal will develop into the multimedia contact point for all drive, control and motion technology topics in the industrial and academic training sectors and further education as well as qualification.

This unique contact point in the Internet will give the users access to high-quality information and allow for a structured exchange of knowledge and experience.
DS4NA Fluid Power Training System

Rexroth’s technical know-how and solution competence in the area of industrial applications are smoothly integrated into the modularly structured training systems – in this way, they perfectly satisfy the quality levels demanded by industry.

Rexroth training systems
Bosch Rexroth training systems are based on standard components from different Bosch Rexroth product areas. A training system consists of the hardware and the training and project manuals for trainers and trainees. By means of the training systems, both newcomers and advanced users work out practical exercises and gain technical specialized knowledge step-by-step. The trainees will discover the industry standard components used in the training system in machines and systems again in their professional career. Apart from the hydraulic/pneumatic training system described here in the catalog, Bosch Rexroth also offers training systems in the technology areas of Sensors, PLC and Mechatronics. Information on suitable training aides and all other offers of the Drive & Control Academy is available on the Bosch Rexroth website at the address: www.boschrexroth.com/training

DS4NA Fluid Power Training System
The DS4NA training system allows for the transfer of knowledge in both industrial and mobile hydraulics as well as pneumatic technology training. It offers a complete solution for teaching and demonstration of the operation of modern hydraulic and pneumatic circuits and prepares the trainees for their work in the industry. Thanks to the configuration options, the training system can be perfectly adapted to the relevant topic and extended for the use in further trainings. Due to the use of a load sensing piston pump hydraulic unit, the DS4NA is also perfectly suited for mobile hydraulic training and is capable of demonstrating the concepts particular to mobile hydraulics using a hands-on practical approach. The device sets and the associated training manuals for the various study topics prepare the trainees for the tasks and requirements of their later professional life.

Equipment
The DS4NA fluid power training system can be configured and extended and can grow with changes and additions to your curriculum.
Its essential components are:

▶ Hydraulic power unit
▶ Tested/certified safety valves
▶ Industry standard size 6 (DO3) valves
▶ Control blocks for the mobile application area
▶ Cylinders with special protective covers to ensure student safety
▶ Storage and mounting rack for electrical components
▶ Ample built-in equipment storage
▶ Grooved plate and grid for mounting hydraulic and/or pneumatic components and circuits
▶ Measuring glass for oil flow
▶ Rotatable load simulation cylinder
▶ Integrated hose storage

The DS4NA is delivered in a completely assembled and tested condition.

Configured to match your training requirement
Based on your requirements you can choose between the following configurations:
Hydraulics
Two independent work stations are possible by mounting a grid on each side.

Pneumatics
Two independent work stations are possible via a central pneumatic mounting panel.

Hydraulics/pneumatics combined
It is easy to mount one or two grids with the central mounting panel in place which allows for maximum flexibility. This way training in either or both of these disciplines is possible.

Expandable for additional study topics
In order to achieve your training targets, you can individually adjust your training system to your requirements. You can therefore realize training on the following topics:

▶ On/off hydraulics
▶ Proportional valve technology (open/closed loop)
▶ Mobile hydraulics
▶ Pneumatics
▶ Electro-pneumatics
▶ Sensor and PLC technology
Safety
The DS4NA training system had been designed with student safety in mind and conforms to all local safety specifications.

Configuration
Adapt your DS4NA training system exactly to your requirements. We will support you in equipping your fluid power training system to meet your specific needs. Contact us!

Flexibility
Whether you want to train on hydraulics, pneumatics or mechatronics it can all be done utilizing the one base DS4NA platform. This means that your training rooms can be for multiple purposes and in the end you save money when training on multiple technologies or multiple technology levels.

Security
All of the storage areas on the training stand are lockable so that the componentry or tools stored within are all kept secure. The component mounting plates can also be locked onto the grid using an industry standard cable lock. Simply feed the locking cable through the holes provided in the mounting plates to secure the components to the grid.

A standard cable lock with 3/16" (5mm) cable can be found in your local hardware store.
Getting Started

1. Pick a training stand to satisfy your drive and control training requirements

Pneumatics
Training stand type DS4NA-1X/2P (see page 12)
Double sided to allow two separate groups.

Accommodates training in the following topics:
- Manually operated pneumatic valving
- Electro-pneumatics *
- Additional pneumatic components and sets are available.
  Please contact us.

Additional training topics are possible:
- Sensor technology *
- PLC control *
- Mechatronics *

Hydraulics
Training stand type DS4NA-1X/2H (see page 13)
Double sided to allow two separate groups. Can easily be upgraded for pneumatic and mechatronic training.

Accommodates training in the following topics:
- Manually operated hydraulic valving
- Electro-hydraulics *
- Proportional control *
- Closed loop electro-hydraulic position control *
- Mobile hydraulics
- Additional hydraulic components and sets are available.
  Please contact us.
2. Start with the basics
The basic component set in any of the technologies can be used immediately with the basic training stand.
▶ Manually operated hydraulics
▶ Mobile hydraulic principles
▶ Basic pneumatics

3. Don’t forget the curriculum
Each component set has curriculum available in the form of lab exercises or project work with both trainer and trainee manuals available.

4. Expansion to additional technology is easy
The possibilities are nearly endless since you can freely expand the level of technology without having to change the base. Expansion sets integrate into the component packages you already have. You can add component sets or even individual components to suit your needs exactly. Please contact us for the full range of component sets and individual components which are available.

5. We are here to help
We also offer many tools to support your training efforts such as simulation software, on-line learning, presentation material and much, much more. Please contact us for more information.

Fluid power
Training stand type DS4NA-1X/2P2H (see page 16)
Double sided to allow two separate groups. Can be used for simultaneous pneumatic and hydraulic training.

Accommodates training in the following topics:
▶ Manually operated pneumatic valving
▶ Electro-pneumatics * †
▶ Additional pneumatic components and sets are available.
  Please contact us.
▶ Manually operated hydraulic valving
▶ Electro-hydraulics ‡
▶ Proportional control ‡
▶ Closed loop electro-hydraulic position control ‡
▶ Mobile hydraulics
▶ Additional hydraulic components and sets are available.
  Please contact us.

Additional training topics are possible:
▶ Sensor technology †
▶ PLC control * †
▶ Mechatronics * †

Ref. Component sets data sheet for additional information.

See Fluid power component sets data sheet for all available technologies.
* Requires central electrical panel (R987403624) for mounting electrical devices.
(see page 19)
† Requires additional 24VDC power supply (see page 21)
‡ Requires central electrical panel (R987403624) plus 19" single or double rack for mounting electrical devices (see page 19)
Work Stations
**Fluid power training system – system description**

The hydraulic/pneumatic training system for basic and advanced training was developed to meet the increasing requirements in the field of fluid power technology.

The basic training system consists of a base frame with swiveling, lockable castors to allow for easy movement. Each side of the stand has a drip tray/working area complete with integrated component storage station and a 2-drawer heavy duty tool box. Mounting of the training componentry is via either a central grooved panel for pneumatic componentry or a wire grid frame for hydraulic componentry.

When configured as a pneumatic trainer a central grooved panel is fitted which allows mounting and connection of pneumatic and electrical components on either side of the training stand. Two groups of students may therefore work on opposite sides of the trainer. As a hydraulic trainer the exercises are set up on grid frames and then connected by hoses. Zero leak quick-disconnect couplings of the hydraulic hoses allow the training exercises to be carried out quickly and safely. Both mounting systems can be used and very easily interchanged allowing one training stand to be used for training in both pneumatics and hydraulics.

A rotatable load simulator and numerous component sets are available thus enabling the training stand to be used for the complete spectrum of pneumatic and hydraulic technology training, which guarantees your training success.

**Features**

- Training system for basic and advanced training in accordance with practical needs
- Rugged and stable design
- Low operating noise
- Powered by standard 110Volt/15Amp wall outlet
- Movable via stable, swivel, lockable castors
- Modular structure for ease of expansion
- Use of standard size 6 (DO3) components from Rexroth’s industrial valve product range
- Clearly arranged and carefully thought-out design
- Extensive selection of component sets
  - basic pneumatics
  - electro-pneumatics
  - sensor technology
  - lever operated hydraulics and electro-hydraulics
  - proportional hydraulics
  - mobile hydraulics
  - open and closed loop axis control
- With detailed and clearly structured student and instructor’s training manuals.
Training Stand – Typical Variations
Pneumatic training system with provision for 2 pneumatic stations

Model: TS-DS4NA-1X/2P
Material number: R987419737
Replaces model code: TS-DS4NA-1X/NU00V0A0M0L0

For simultaneous training of two groups of 2-3 students on pneumatic or mechatronic technology.
Training Stand – Typical Variations
Hydraulic training system with provision for 2 hydraulic stations

Model: TS-DS4NA-1X/2H
Material number: R987418570
Replaces model code : TS-DS4NA-1X/G2UN2V6A0M2L0

For simultaneous training of two groups of 2-3 students on hydraulic technology

A. 2x measuring glass
B. 2x P/T/X connection block with “load sensing”
C. Hydraulic power unit with two pump/motor groups
D. Base frame
E. 2x grid for hydraulic component mounting
F. 2x ON/OFF starter box with E-STOP and 24 VDC power supply
G. 2x lockable hinged oil drip tray/working surface
H. 2x lockable component storage area
I. 2x heavy duty lockable 2-drawer toolbox
J. Double sided hose storage area
K. Heavy duty locking swivel casters
L. Oil drip tray

Dimensions (LxHxW):
62.5in x 69in x 34in
1585mm x 1745mm x 855mm
Weight: 1035lb / 470kg
Training Stand – Typical Variations

Hydraulic training system with provision for 1 hydraulic station

Model: TS-DS4NA-1X/1H
Material number: R987412652
Replaces model code: TS-DS4NA-1X/G1UN1V5A0M1L0
Training Stand – Typical Variations
Fluid power training system with provision for 2 pneumatic stations and 1 hydraulic station

Model: TS-DS4NA-1X/2P1H
Material number: R987419738
Replaces model code: TS-DS4NA 1X/GNUN1V5A0M1L0
Training Stand – Typical Variations
Fluid power training system with provision for 2 pneumatic stations and 2 hydraulic stations

Model: TS-DS4NA-1X/2P2H
Material number: R987419739
Replaces model code: TS-DS4NA-1X/G2NUN2V6A0M2L0

Dimensions (LxHxW):
62.5in x 69in x 34in
1585mm x 1745mm x 855mm
Weight: 1100lb / 500kg
Hydraulic Data

The hydraulic power unit is supplied fully function tested and adjusted with every hydraulic training stand. Each side of the training stand is supplied by a separate tank-top mounted pump/motor group including a variable displacement swashplate piston pump. Training stands with a single hydraulic side are supplied with a single pump/motor group however the remainder of the power unit is of a common design.

<table>
<thead>
<tr>
<th>Material</th>
<th>Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finish</td>
<td>Blue powder coating</td>
</tr>
<tr>
<td>Pump type</td>
<td>Swashplate piston</td>
</tr>
<tr>
<td>Flow rate</td>
<td>2.1 gpm (8 l/min)</td>
</tr>
<tr>
<td>Compensator pressure</td>
<td>725 psi (50 bar)</td>
</tr>
<tr>
<td>Standby pressure</td>
<td>200 psi (14 bar)</td>
</tr>
<tr>
<td>Safety pressure</td>
<td>1000 psi (50 bar)</td>
</tr>
<tr>
<td>Reservoir volume</td>
<td>10 gal (40 litre)</td>
</tr>
</tbody>
</table>

Electrical Data

A starter box mounted in the working area of the training stand allows each group to start and stop their hydraulic supply independent from the other group. In an emergency situation however depressing any E-STOP button will stop both electric motors. The values below are for the supply of each electric motor

<table>
<thead>
<tr>
<th>Voltage supply</th>
<th>120V single phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other voltages available on request</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>60Hz</td>
</tr>
<tr>
<td>50Hz available on request</td>
<td></td>
</tr>
<tr>
<td>Power</td>
<td>1 HP (.78 kW)</td>
</tr>
<tr>
<td>Max. current draw</td>
<td>13 Amp (operating)</td>
</tr>
</tbody>
</table>
Training Stand – Optional Equipment
A. Electrical device mounting panel
   Order material number R987403624
B. Rotatable cylinder
   Order material number R987403594
C. Reservoir viewing window set
   Order material number R98******
### Training Stand – Optional Equipment

#### Electrical devise mounting

Required when using electrically (ON/OFF or proportional) operated valving

<table>
<thead>
<tr>
<th>Rack type</th>
<th>Single row rack</th>
<th>Double row rack</th>
<th>Central panel</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part number</strong></td>
<td>R961000167</td>
<td>R961000166</td>
<td>R987403624</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>19&quot; rack for mounting</td>
<td>19&quot; rack for mounting</td>
<td>Required for attachment of</td>
</tr>
<tr>
<td></td>
<td>electrical devices from</td>
<td>electrical devices from</td>
<td>either single or double</td>
</tr>
<tr>
<td></td>
<td>the hydraulic component</td>
<td>the hydraulic component</td>
<td>row rack</td>
</tr>
<tr>
<td></td>
<td>range</td>
<td>range</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Will accommodate the</td>
<td>Will accommodate the</td>
<td>For direct mounting of</td>
</tr>
<tr>
<td></td>
<td>following electronic</td>
<td>following electronic</td>
<td>'housed' electrical devices</td>
</tr>
<tr>
<td></td>
<td>sets</td>
<td>sets</td>
<td>from the pneumatic component</td>
</tr>
<tr>
<td></td>
<td>► ON/Off electro-hydraulics</td>
<td>► ON/Off electro-hydraulics</td>
<td>range.</td>
</tr>
<tr>
<td></td>
<td>► Proportional</td>
<td>► Proportional</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hydraulics</td>
<td>hydraulics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>► Proportional position</td>
<td>► Proportional position</td>
<td></td>
</tr>
<tr>
<td></td>
<td>control</td>
<td>control</td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions mm</strong></td>
<td>W 1130 x H 173 x D 200</td>
<td>W 1130 x H 306 x D 200</td>
<td>W 1130 x H 170 x D 30</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>17 lb (7.9 kg)</td>
<td>26 lb (11.6 kg)</td>
<td>6 lb (3.7 kg)</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>Aluminum profile, powder coated steel</td>
<td>Aluminum profile, powder coated steel</td>
<td>Aluminum profile, powder coated steel</td>
</tr>
</tbody>
</table>
## Training Stand – Optional Equipment

### Load simulator 15 kg rotatable
**TS-DS4NA-RLS**

<table>
<thead>
<tr>
<th>Part no.</th>
<th>R987403594</th>
</tr>
</thead>
</table>

Intended for attachment to the sides of DS4NA trainer; including 2 hose lines with 90° fitting 2 m long; complete with safety mounting, protective cover and provision for mounting proximity switches, without end position cushioning; connections via quick disconnects.

<table>
<thead>
<tr>
<th>Dimensions LxWxH</th>
<th>18&quot; x 24&quot; x 18&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>250mm x 600mm x 250mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight</th>
<th>55 lb/25 kg</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Steel, acrylic glass</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Moving mass</th>
<th>33 lb/15 kg</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Cylinder dimensions in(mm)</th>
<th>1/0.7x8 (25/18x 200)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Load direction</th>
<th>Compressive or overrunning</th>
</tr>
</thead>
</table>

### Reservoir viewing window set
**TS-DS4NA-RVW**

<table>
<thead>
<tr>
<th>Material no.</th>
<th>R98*******</th>
</tr>
</thead>
</table>

Clear polycarbonate clean-out covers to allow viewing of the inside of the hydraulic reservoir. Supplied in a set complete with all parts required to replace the existing steel cleanout covers. Also includes bulkhead fitting to facilitate draining of the reservoir.

<table>
<thead>
<tr>
<th>Dimensions Dia x thick</th>
<th>12-1/2&quot; x 1/5&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>320 mm x 13 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight</th>
<th>2.2 lb (1 Kg)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Polycarbonate glass</th>
</tr>
</thead>
</table>

### Central Pneumatic Panel assembly
**TS-DS4NA-CPP**

<table>
<thead>
<tr>
<th>Material no.</th>
<th>R98*******</th>
</tr>
</thead>
</table>

For expansion of a single or double sided hydraulic training stand to accommodate pneumatic training. Central installation allows pneumatic components and electrical control boxes to be mounted on one or both sides. The grids may still be used for hydraulic training.

<table>
<thead>
<tr>
<th>Dimensions L x W x thick</th>
<th>44&quot; x 28&quot; x 1.18&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1130mm x 700mm x 30mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight</th>
<th>54 lb/24.5 kg</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Aluminum profile</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Delivery form</th>
<th>Panel c/w all necessary installation hardware</th>
</tr>
</thead>
</table>
Training Stand – Optional Equipment

24VDC power supply assembly
TS-DS4NA-PS

<table>
<thead>
<tr>
<th>Material no.</th>
<th>R98******</th>
</tr>
</thead>
</table>

For installation on pneumatic training stand to allow for electro-pneumatic training. One power supply required for each side of the training stand.

- **Input power**: 120V/60Hz
- **Output voltage**: 24 VDC
- **Output current**: 5 Amp
- **Dimensions L x W x H**: 11.75" x 8.5" x 12"
  
300mm x 220mm x 305mm
- **Weight**: 13.5 lb/6.1 kg
- **Material**: plastic enclosure, blue powder coated steel bracket
- **Delivery form**: Prewired with standard 120V/60Hz cord/plug and assembled with all necessary installation hardware

Hydraulic component and hose storage rack
TS-DS4NA-CSR

<table>
<thead>
<tr>
<th>Material no.</th>
<th>R98******</th>
</tr>
</thead>
</table>

Welded and powder coated steel component carrier based on the TS-DS4NA trainer design. A grid on each side allows ample storage area for grid mounted componentry as well as two full size roller tool cabinets and a hose storage area for storage of 50 hoses.

- **Dimensions L x W x H**: 51.75" x 69" x 34"
  
1315mm x 1745mm x 855mm
- **Weight**: 670 lb/304.5 kg
- **Material**: Blue powder coated and welded steel structure
- **Delivery form**: Delivered in a completely assembled condition

Set of pneumatic component storage plates
TS-DS4NA-PCSP

<table>
<thead>
<tr>
<th>Material no.</th>
<th>R98******</th>
</tr>
</thead>
</table>

Storage plates to accommodate the devices contained in the basic pneumatic and electro-pneumatic component sets. Symbols printed on plates for component location.

- **Dimensions L x W x H**: 47" x 13" x 1.18"
  
1200mm x 330 mm x 30 mm
- **Weight**: 6 lb/2.75 kg
- **Material**: Stainless steel
- **Delivery form**: Delivered loose for installation in TS-DS4NA component storage area
Additional Information

▶ For additional information and details regarding all hydraulic components and accessories for training please reference our full Hydraulic Training System datasheet R961006865.

▶ For additional information and details regarding all pneumatic components and accessories please reference our full Pneumatic Training System datasheet R999000218.

▶ For additional information regarding teacher and student manuals, as well as instructor training tools and resources please reference our full Learning Media datasheet DCA-DE_EN_ES_000009.

Other Offerings

- Sensor technology
- Mechatronic modules and systems
- PLC technology
Training seminars
- Standard and customized
- At our location or yours

On-line training courses
- Training aides
The data specified above only serve to describe the product. As our products are constantly being further developed, no statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.