CARBON ZAPP

CZ Operation Manuals

RiD90115

MTBR-D Manual_2021-8

CARBON ZAPP

MTBr-D - Operating Manual v2021.8

2 –Year Limited Warranty

Carbon Zapp company manufactures its equipment from new parts and components that are in accordance with industry standard practices. Carbon Zapp warrants that the equipment it manufactures will be free of defects in materials and workmanship.

The warranty terms are 2 years, beginning on the date of the Carbon Zapp invoice in accordance with the following described:
This warranty does not cover damage due to external causes, including accident, abuse, misuse, scratches on external components or surfaces, problems with electrical power supply, servicing not authorized by Carbon Zapp, usage not in accordance with machine's operating manual, failure to perform required preventative maintenance, failure to change the calibration oil and other ultrasonic cleaning or testing fluids regularly, failure to change the main testing and flushing fluid (where applicable) filter when needed, to permit machines fluid pump to sit or operate without fluid in it, usage of improper testing or cleaning fluid in the machine, usage of improper fluid for the application, usage of cleaning solvents, chemicals, parts and components not provided or indicated/approved by Carbon Zapp.

Note 1: Machine consumable and wear parts are excluded from warranty. Such parts are considered all user interfered parts for connecting the components to be tested. Specifically, external electrical cables and connectors, low pressure oil hoses, hydraulic connectors and components, high pressure hoses, adapters and fittings, injector spray chambers, response sensors, couplings, flanges, and other fittings, will be voided from warranty unless there is a manufacturing defect detected at first run.
Note 2: Failure to clean injectors with Carbon Zapp's ultrasonic device before any test is performed on the test bench will void the warranty of the machine, if dirt particles from the injectors or components tested enter the machine valves, sensors, and circuit.
Note 3: The tablet HMi touchscreen is voided warranty if mishandled, misused, abused or accidentally broken while using. Only manufacturing defects of it will be warrantied.
Note 4: [MTBR & BCR KITS ONLY] The High-Pressure regulator valve (DRV/PCV/HPV) is voided warranty on these specific units as Carbon Zapp cannot control the quality of the master (pump) parts used.

Assure all inline screen filters and HD inline filters are mounted and replaced periodically according to machine indications otherwise warranty is voided.
Carbon Zapp will repair or replace parts and components returned to manufacturer's facility. To request warranty service, contact Carbon Zapp within the warranty period. If warranty service is required, you must ship the defective part or component in their original or equivalent packaging, prepay shipping charges, and insure, or accept the risk of loss or damage during shipment. Carbon Zapp will return the repaired or replacement part or component freight prepaid. If Carbon Zapp repairs or replaces a part or component, its warranty term is Not Extended.

Carbon Zapp does not accept liability beyond the remedies set forth in this warranty statement or liability for incidental or consequential damages.

*Machine serial number:*_____

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Machine Views

Main View (Left Side)

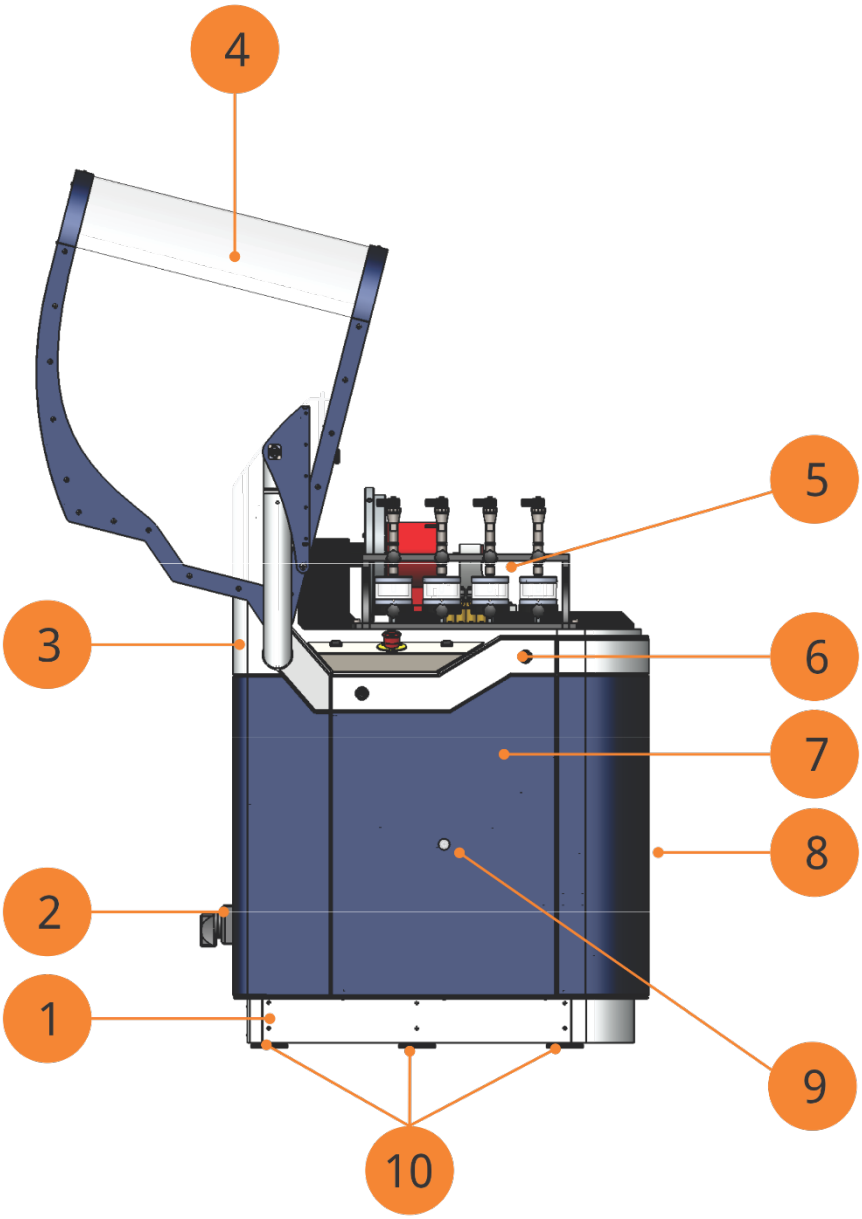


Figure 1: Main View (Left side)

1. Fork Lift panel
2. Mains Power Switch / Power Harness
3. Rear Panel

4. Protective Hood
5. Main Work Area
6. Side Panel Locks
7. Side Panel(s)
8. Front Panel / Air Exhaust System
9. Test Oil Tank Level Indicator
10. Rubber Pads

Front Side

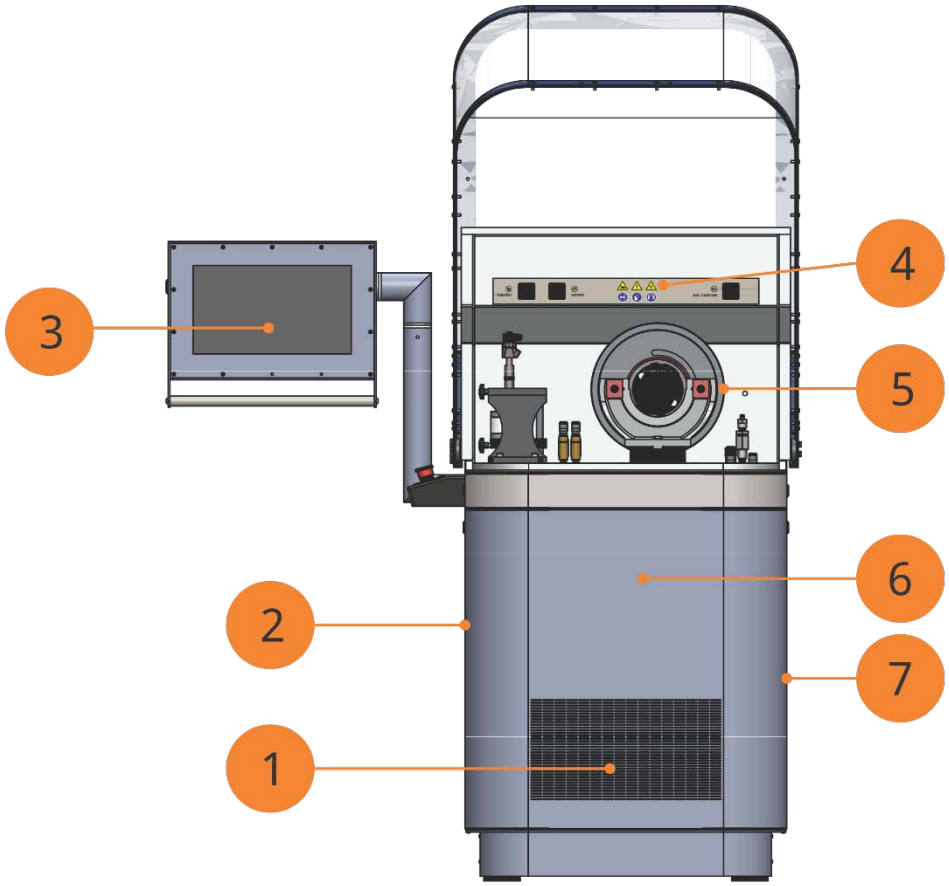


Figure 2: Front Side

1. Air Exhaust System
2. Left Side Panel
3. Control Panel (HMI / Tablet)
4. Injector/Pump/Sensor Wiring Harness Panel
5. Fly Wheel
6. Front Panel
7. Right Side Panel

Rear Side

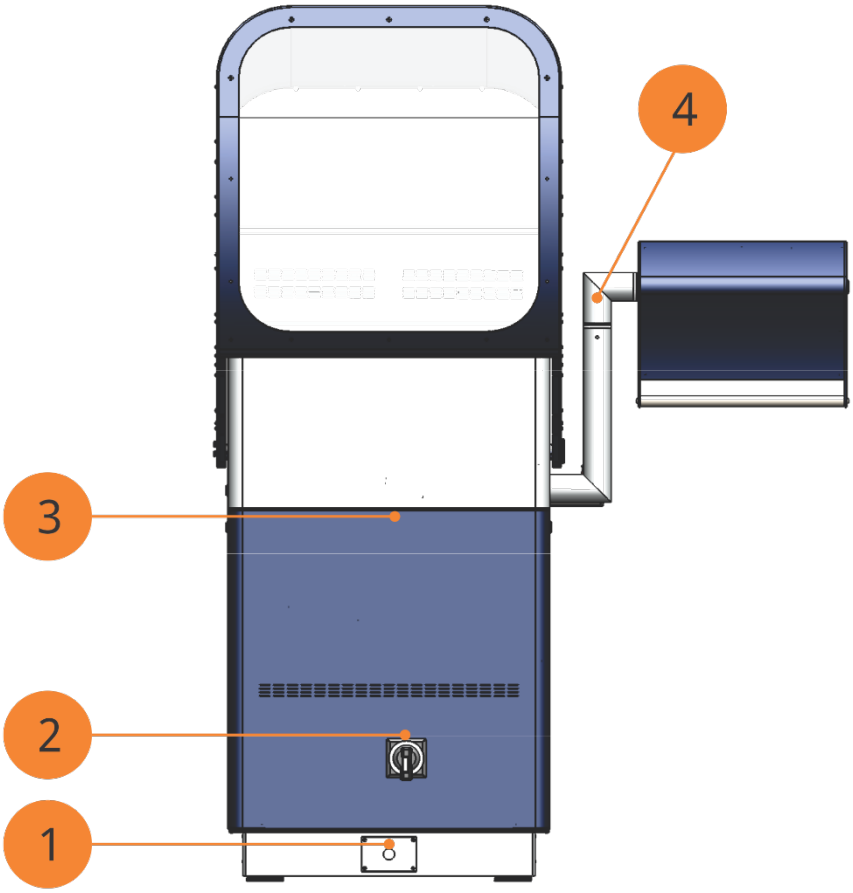


Figure 3: Rear Side

1. Mains Power Harness Port
2. Mains Power Switch
3. Rear Panel / SN Tag
4. HMI Extend / Rotate Support Rod

Top Side

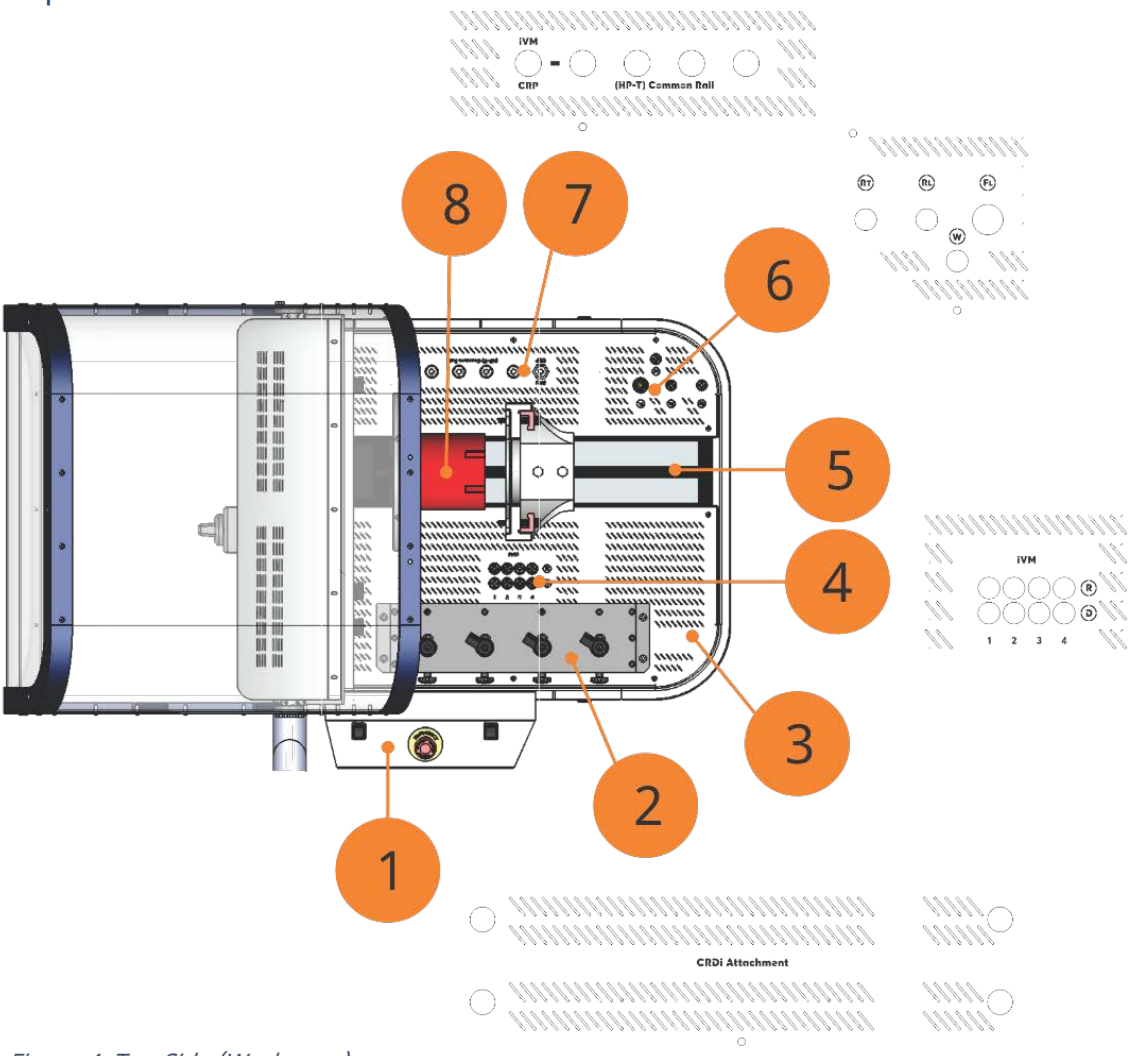


Figure 4: Top Side (Work area)

1. Emergency Stop Switch / Motorized Protective Hood Controls
2. CRDi Kit with CRi Injectors
3. Work Area Drip-Pan (Direct to Waste Tank)
4. Discharge [D] and Return [R] Ports for 4 slots, CRi, EUI & HEUI Injectors
5. Base for mounting CR-Pumps & CAM-Box
6. General Ports:
    a. [RT] Return to Tank Port >>> Used for sending the secondary return of the CR-Pump directly to the Tank, bypassing the Volume Sensor
    b. [RL] Return Line Port >>> Used to measure the Return Volume of the CR-Pump.
    c. [FL] Feed Line Port >>> Used to supply the Test Oil to the CR-Pump.
    d. [W] Waste Port >>> Used for flushing CR-Pumps, goes directly to Waste Tank.

Component/Actuator, Setup Views

Figure 5: CR-Injector & HEUI Setup

Figure 6: CR-Pump Setup

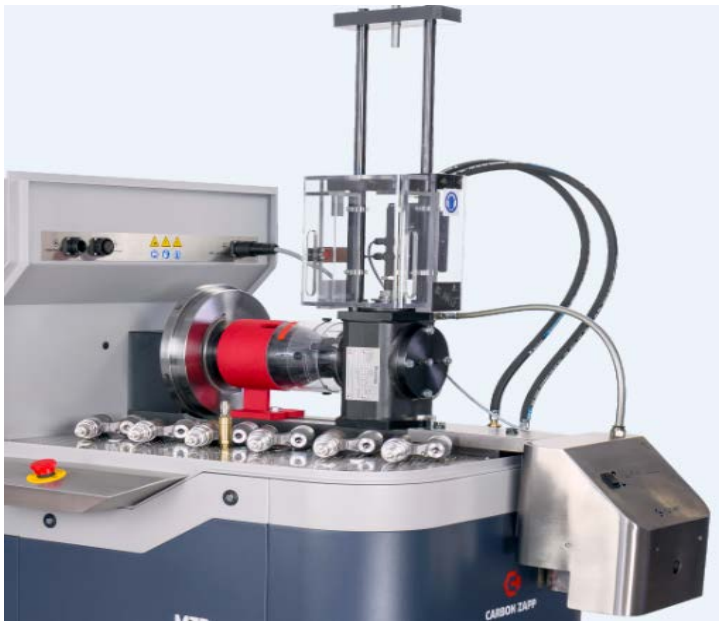


Figure 7: EUI (Cambox) Setup

Workshop Requirements

- The MTBr-D unit may not be operated unsupervised. It may only be used by trained personnel.
- Any service or diagnosis must be performed by trained technical personnel with knowledge of electrical and hydraulic systems in heavy duty machinery.
- The temperature of the calibration oil may not exceed 45 °C; if the temperature is higher, the operator must provide an appropriate external cooling device or adjust the room temperature according to specifications up to 35°C.
- Sufficient ventilation for the MTBr-D must be achieved, therefore a surrounding distance from other objects of at least 50 centimeters must be left. To prevent any overheating, the air grills should not be covered.
- It is recommended that the operator installs a fumes extractor above the unit. Please Note the opening height of the hood (Technical Specification section).
- The operator must provide a 35 A preliminary fuse.

Operation Requirements

- **WARNING – Risk of injury from pressurized calibration oil leakage or escaping parts**

  Always check all hoses on the MTBr-D test equipment and the component to be tested to be properly connected and tightened to the right torque specification.

- Replace any leaky or defective hoses.
- Wear protective goggles.
- Wear protective boots.
- Wear protective gloves.
- Wear ear protection. Noise can damage hearing.

Transportation

WARNING – Risk of injury from improper transportation of the MTBr-D

- Assure the unit is always in the upright position.
- Improper moving of the MTBr-D could lead to injuries.
- Pay attention to the center of gravity of the MTBr-D as shown below.
- Wear safety shoes and protective gloves.
- Always use suitable transportation and lifting equipment.
- The unit is to be carried and installed only by trained personnel.

Figure 8: Transportation markings (center of gravity)

Packaged Unit: Please check for major damages caused by transport. Pay attention to the center of gravity signs on the wooden box for proper handling and movement.

Figure 9: Un-boxing the unit

Carefully unbolt the wooden box on all sides using a screw driver (electrical or handheld).

Figure 10: Revealing the unit (Remove wraps and straps)

Carefully cut the plastic heavy duty straps holding the MTBr-D machine to the wooden pallet. Afterwards, cut using a blade/knife the plastic clear protective wrap, and unwrap the unit. Finally, remove completely and dispose properly.

Setup

Prerequisites

The following requirements must be met by the operator prior to initial setup of MTBr-D unit (NOT included Master Common Rail Pump, we suggest 0445010081, 0445010090, 0445010107, 0445010125, 0445010213, 0445010343, 0445020037, 0445020039, 0445020105, 0445020026, 0445020057):

- The area in which the MTBR-D will be operated must not be at open air but has to be in a covered building.
- The workshop floor must be level and industrial type.
- Recommended to use and a fumes extraction system.
- Laboratory / Workshop room temperature must be between 5-35°C.
- A grounded, 3-phase symmetrical AC network with 50/60 Hz mains frequency.
- Back-up fuse protection required: 400 V – 500 V = 35 amps 200 V – 240 V = 63 amps (acceptable V fluctuation less than ±10 %.

Figure 11: Electrical Socket - Setup

Cut loose the power supply wire cable held with a tie-wrap and properly connect to a 32A, 3-phase power suppply connector which is proper for your workshop. The power connector is not included in the scope of delivery of the MTBr-D. The power connector must be provided by the owner.

Electrical connection

DANGER – Risk of electric shock from live parts

Even when the master switch is off, the input terminals L1, L2, L3 are live. Contact with the input terminals L1, L2, L3 will lead to electric shocks, heart failure and fatal injury. Assembly of the mains 3-Phase Power Cord Connector must be performed by qualified electricians or authorized personnel. The schematic below shows you how to properly connect this harness to your 3P Mains supply

Main Power switch is located behing the machien where the main power cable is. The switch should be in the OFF position at rest. Move the switch clockwise to the ON position to power up the MTBr-D machine.

Figure 12: Mains Power Switch

Electromagnetic compatibility (EMC)

The MTBr-D unit fulfills the requirements of the EMC directive 2004/108/EG. The machine may cause high-frequency household interference (radio interference), therefore it is recommended to take actions to reduce this.

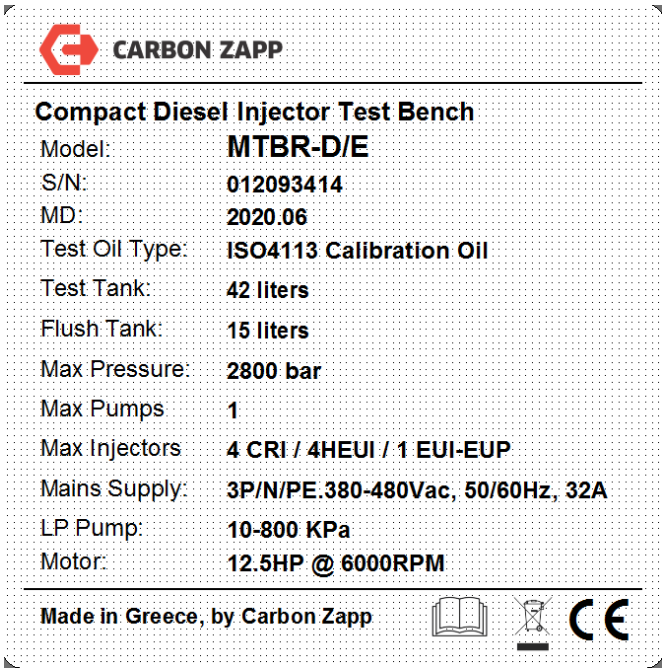


Figure 13: Serial Number Tag

Fork Lift Covers

Unwrap the side metal covers fro the lower parts of the unit. These are only to hide the opening fro the forklift to transport the unit.. Use the screws supplied with the panels to bolt them on each side as shown in the picture.

Figure 14: Lower Fork Lift Side Panels.(Install once moved to desired location)

Opening the protective hood (Only in electrical protective hood version)

Figure 15: Open the Protective Hood

After you power up the MTBr-D unit, press and hold the 2 Protective Hood buttons UP to open the Hood.

Note: This is a semi-Automatic funtion and you need to press and hold continuously until the complete hood is open. Pay attention to surroundings for safety.

Figure 16: Protective Hood

Included Components

WARNING – Risk of injury from the protective hood

Risk of injury to the head if the protective hood is not fully opened.

Always open the protective hood fully during any work in the components testing area.

Testing components with the MTBR-D is only possible with the protective hood closed.

Carefully cut the plastic straps holding the 2 components boxes inside the Protective hood.

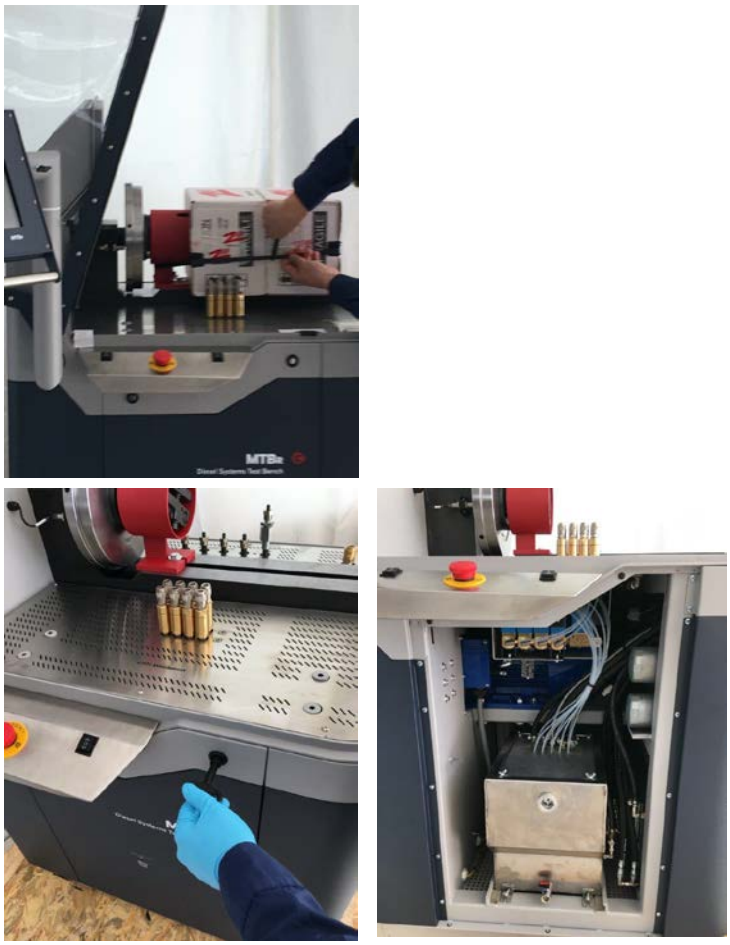


Figure 17: Component boxes & Side Panel keys

Open the components box and find the safety key to open the maintenance side panel. Enter the key as shown and turn to unlock. Pull outwards and lift to remove from the 3 bottom pins.

Filling the Tank with Test Oil

Figure 18: Filling the Tank with ISO4113 Calibration test oil

- As shown above, unboot the butterfly screws to release the Oil tank and pull out half way.
- Furthermore, unbolt the butterfly screws holldign the oil tank cover and fill cap and pull it up.
- Fill the tank up to the top level of the glass indicator ONLY with Approved Calibration oil ISO4113 as listed in the Appendix. Tank capacity is 42L.
- Always assure adequate amount of oil is there for correct and efficient operation of the MTBr-D unit. Recommended to replace the calibration oil at least every 3 months if not earlier indicated by the software.Assure the level indicator is always full.
- Reverse the order to close down the side panel again.

Important Information

Emergency stop

Use the emergency stop switch ONLY in the event of a fault. Should NOT be used as a Start / Stop function. Should only be used as indicated. Pressing the emergency Stop will:

- Stop the test.
- Stop the drive shaft and flywheel immediately.
- Switch Off the cooling fans.
- Switch Off the electric fuel pumps for the calibration oil (this stops also the circulation of calibrating oil through the cooling system).
- NOT switch off the HMI / Tablet.

CR-Pump Installing & Testing

Securing high-pressure pump

Figure 19: CR-Pump Main Base Holder (Setup)

1. Open the protective hood.
2. Attach the main base holder for all types Common Rail Pump AS003-00 to the coupling of the MTBr-D.
3. Assemble the 2 screws with the square shaped Nuts below as shown in the pictures. Tightening torque: 90 ±5 Nm.
4. Carefully slide into the Base Rail.

NOTE:

- Before testing the common rail pump on the MTBr-D, check actuators (DRV, IMV, ZME, EAV, etc.) for short circuit. Resistance between the pins and the housing should be more than 50 Ohm, otherwise the defective valve must be replaced before testing with the MTBr-D.

- Before clamping a common rail pump on the MTBR-D, check the pump housing for cracks and assure the shaft is spinning freely. CR pumps with a firm or blocked shaft or with any other visual defects must not to be tested.

Figure 20: Setup the CR-Pump for mounting

1. Use a Common Rail pump. Recommended to use a Bosch CP3 pump (e.g.: 0445020037).
2. Use the proper CR Pump Flange to bolt on the pump in order to then assemble on the MTBr-D bench at the main base holder AS003-00.
3. Position the high-pressure pump on the clamping flange and attach to the main base holder

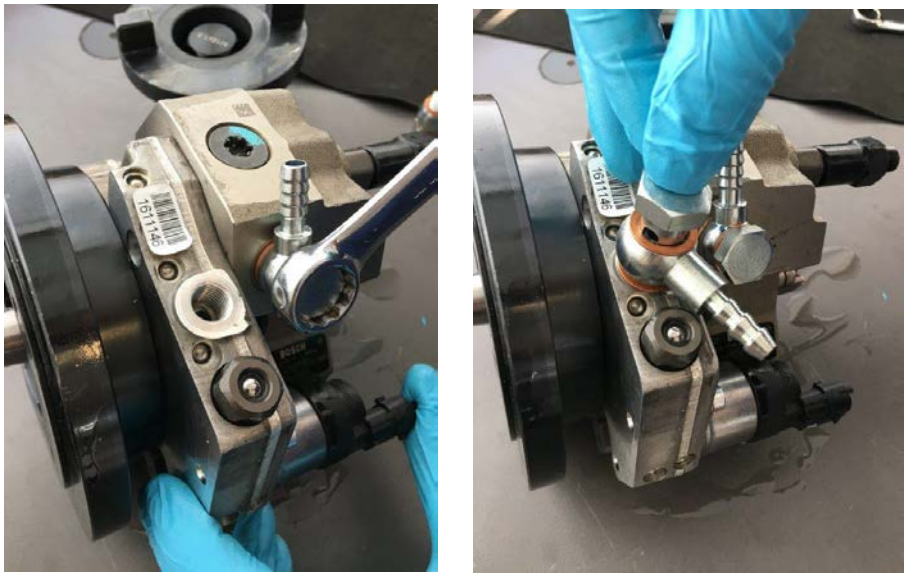


Figure 21: CR-Pump fittings

Use the correct adapters and fittings supplied with the adapters and accessories kit to supply oil feed and return lines to the pump to be tested.

Figure 22: CR-Pump (Joint Adapter)

Use the proper adapter (conical in this case) from the adapters kit supplied to place to the drive shaft of the pump in order to join with the machine flexible coupling.

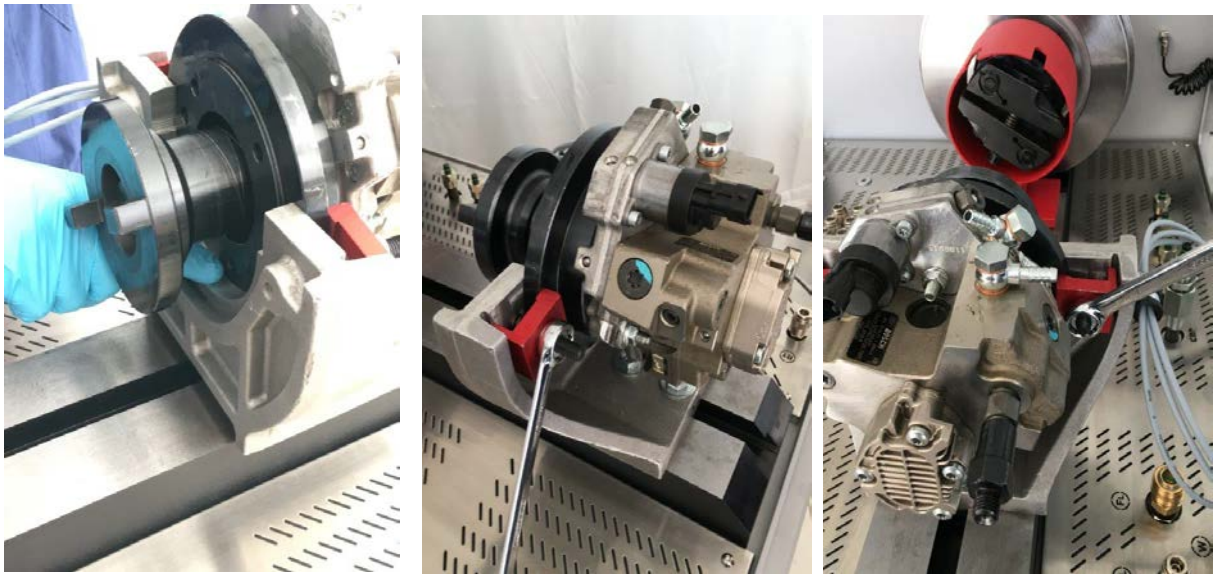


Figure 23: CR-Pump Mounting

Place the pump assembly on the Main Base Holder AS003-00 as shown in the picture above and assure the absolute contact and fitting inside the perimeter as Noted above. Tighten firmly both sides of the pump on the main base holder simultaneously.

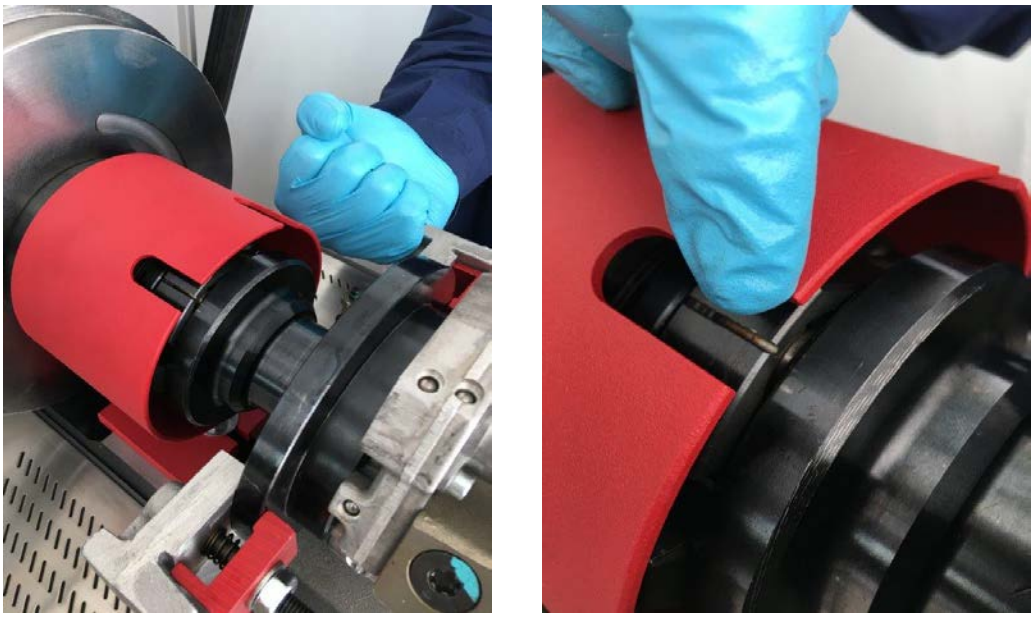


Figure 24: CR-Pump Clamping

Smoothly Slide the pump to touch the flexible coupling.

Once it touches the coupling hit slightly on the pump assembly to go backwards very little soe there is not full contact. A small gap of 1-2mm should be achieved as shown in the picture above.

Figure 25: CR-Pump - Tightening Step-1

Tighten the main Base holder screws to the Base Rail firmly.

Figure 26: CR-Pump - Tightening Step-2

Tighten the Flexible Coupling screws on the pump assembly. Locate the screews throught the oval openings on the red metal protective cover. Turn around the Flywheel to tighten both screws.

Pump Flushing Phase:

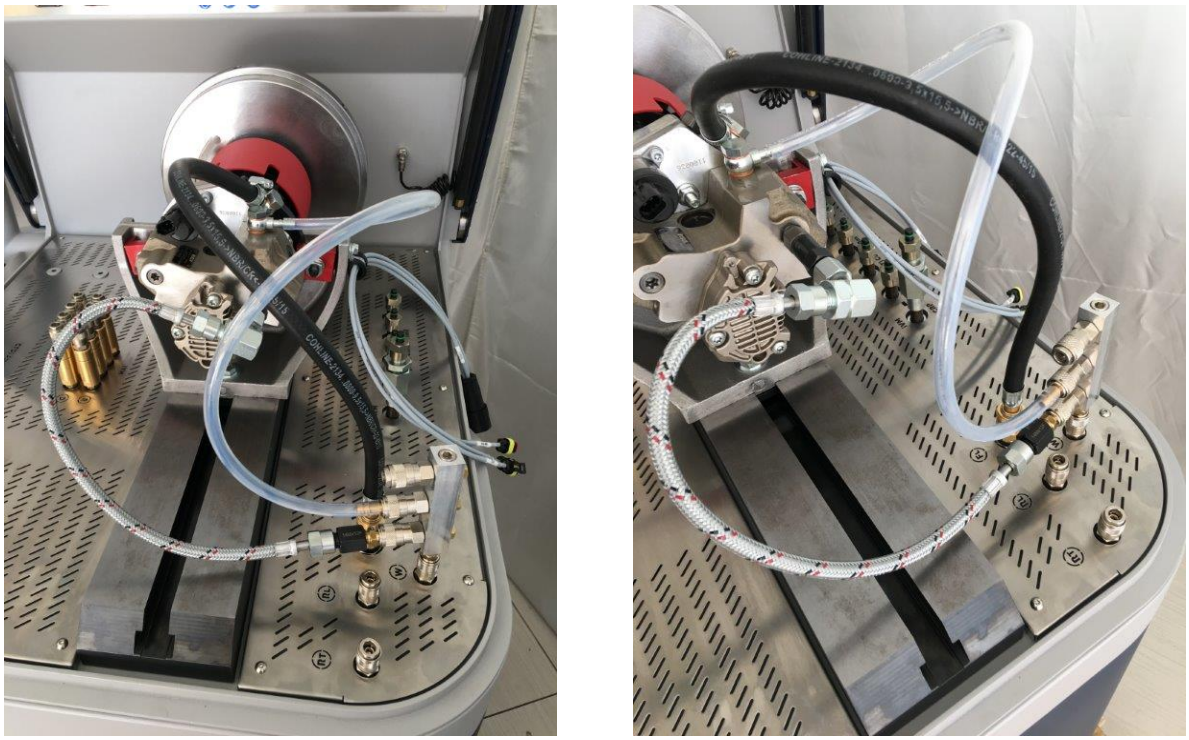


Figure 27:CR-Pump - Flushing

Flush every pump before testing mode. Use the adapter shown above to connect to the pump and flush the pump in the Waste tank.

Connect the High Pressure Output with the connectors and fittings provided to the 3T-Piece.

Connect the Low Pressure retun (single or dual in some cases) to the 3T-Piece.

Choose the pump part number in the MTBr-D AZO software and notice the connection inform in order to use the proper cable to connect to the pump.

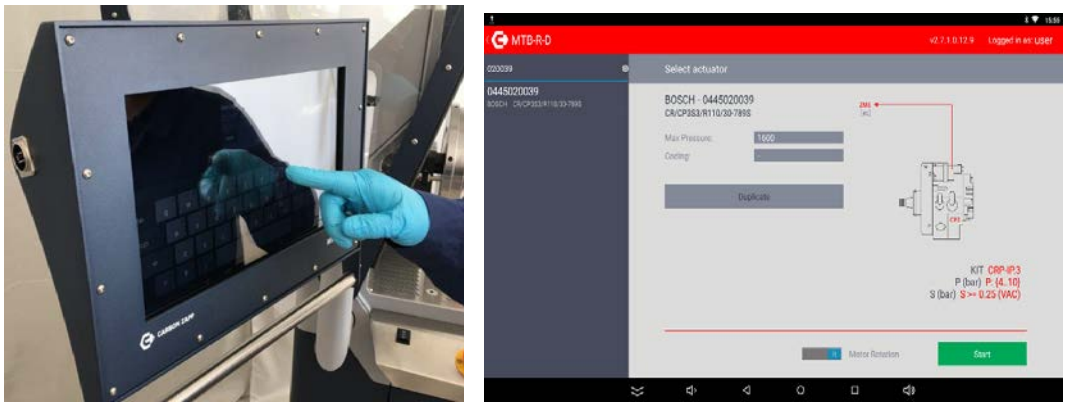


Figure 28: CR-Pump - AZO >> Select Pump

Use the proper cable and extension connector from the adapters and accessories kit provided to connect to the pump control valves.

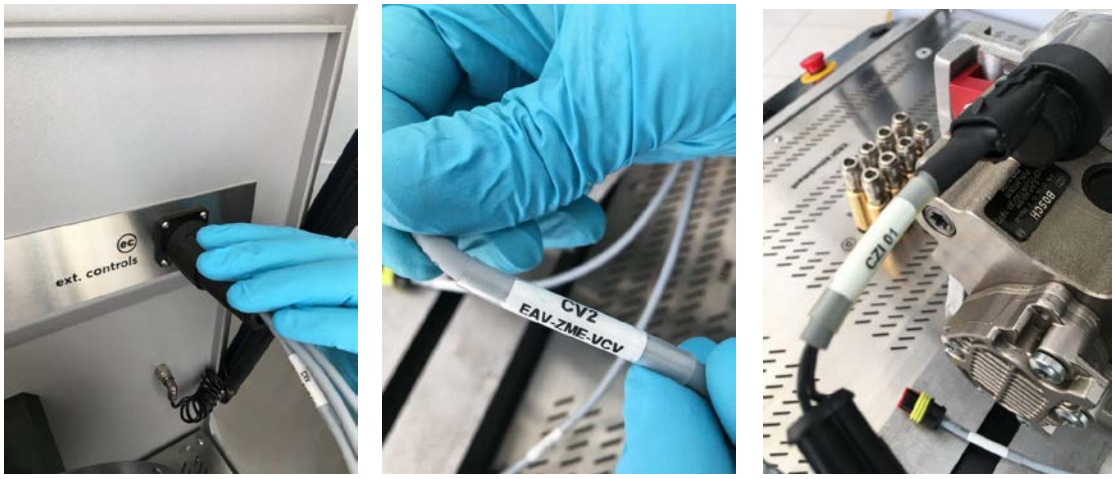


Figure 29: CR-Pump - Connect Wiring Harness

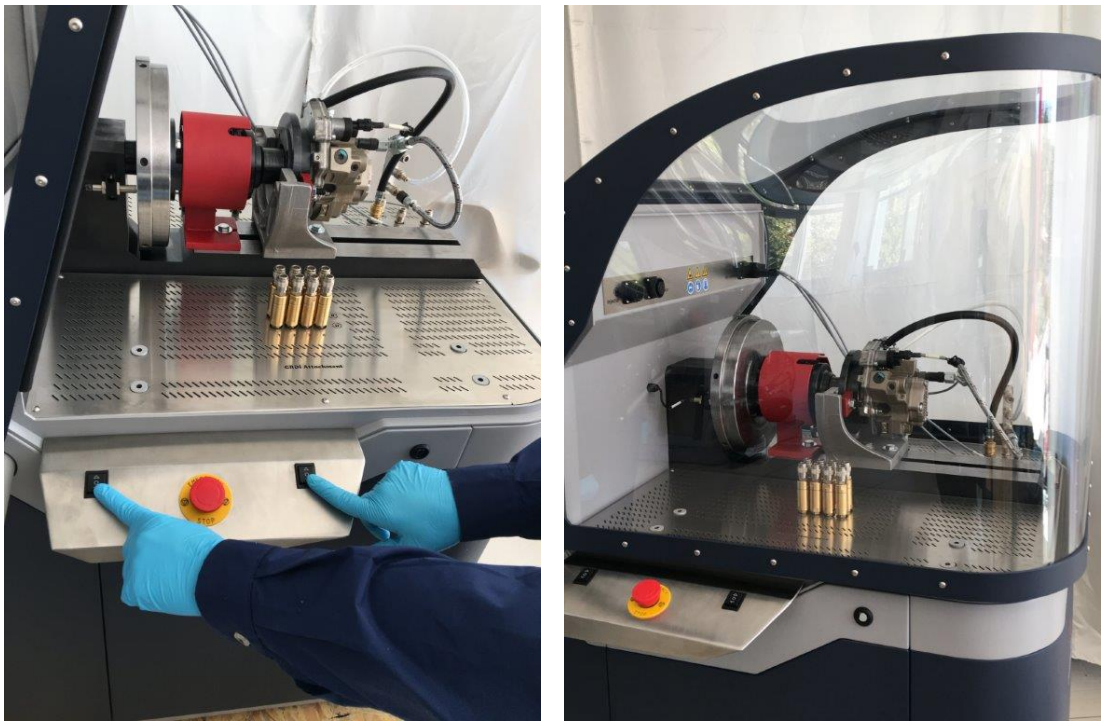


Figure 30: Closing the Protective Hood

Press both control buttton down continiously to close the protective hood and start the clean run (pump flushing).

Once the Protective hood is completely closed, then you can start the clean run.

As indicated in the AZO software press start to flush the pump in the waste tank

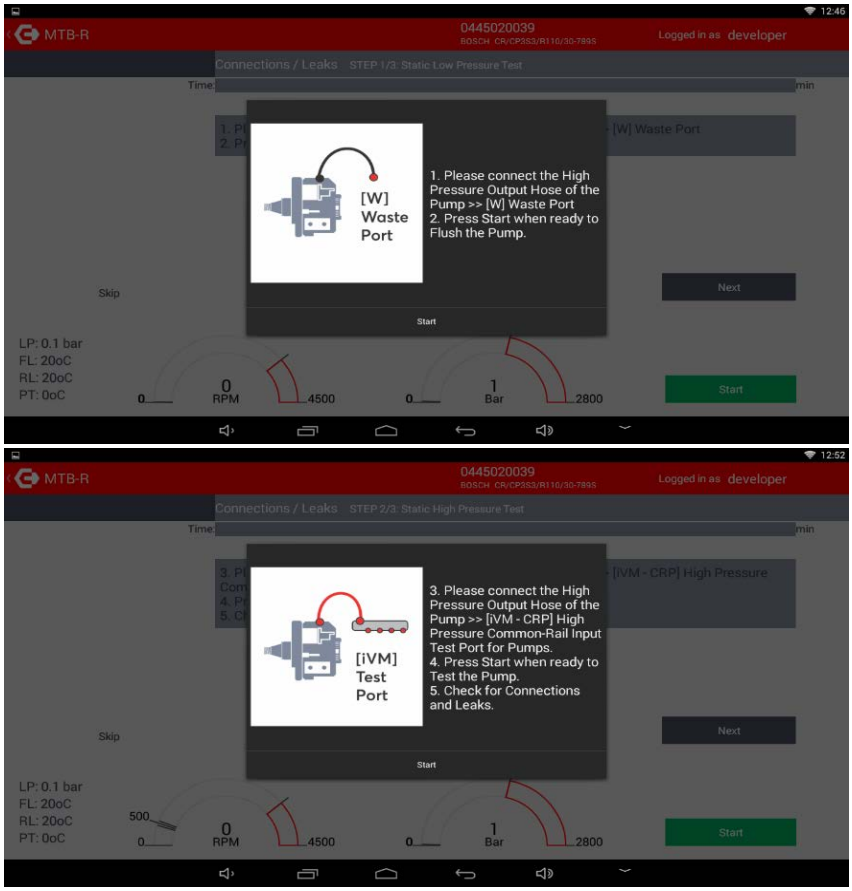


Figure 31: CR-Pump AZO >> Flushing the Pump

When finished, you should notice testing oil in the clear supply/return hoses.

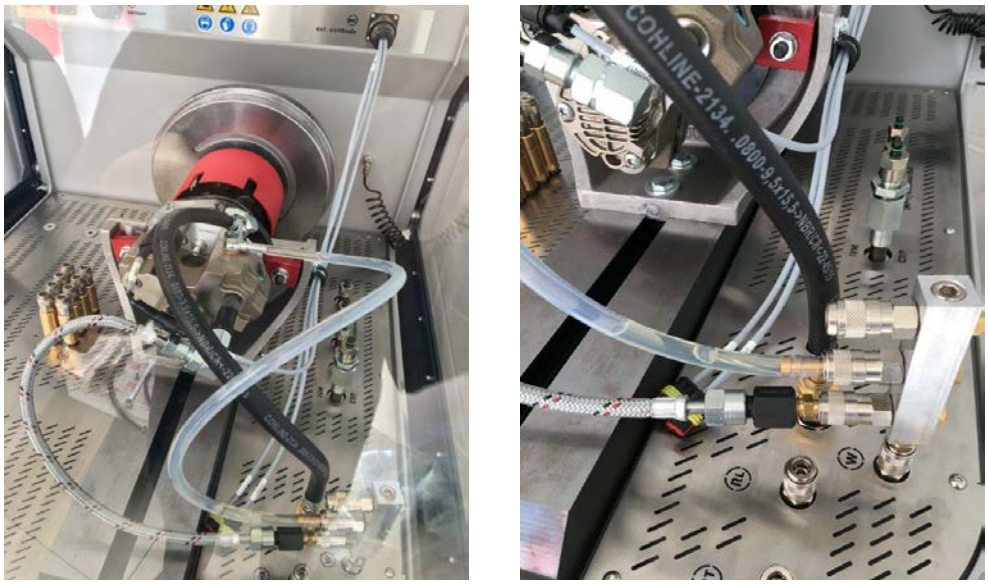


Figure 32: CR-Pump Flushing Connections

Pump Testing:

Figure 33: CR-Pump Initial Test Connections

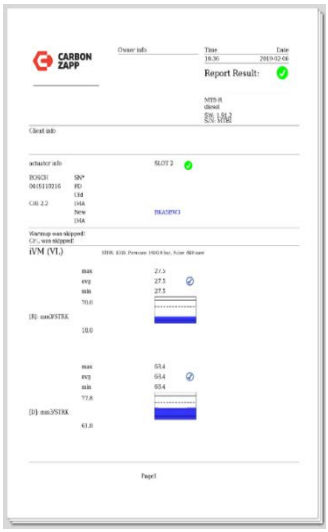
1. Remove the Flush lines to the waste tank and connect the proper feed and return lines to the FL and RL outputs of the MTBr-D unit.
2. Connect the high-pressure hose to the high-pressure pump and the high-pressure rail. Tightening torque: 25 – 30 Nm
3. Continue with the AZO software step by step.
4. The [RT] input is used only for pumps that have a second return (used for lubrication purposes) .
5. The complete test is performed fully automatically from this point onwards.

Bleeding the High-Pressure Rail

Prior to testing, the high-pressure rail must be completely bled and conditioned. This is accomplished by running the CFL3 test for 15min. During this period perform a visual leak detection in the test oil chamber. Eliminate any leaks found and continue with testing.

NOTE:

- Before connecting, clean the HP cones and seats on the high-pressure rail and the high-pressure pump sides.
- Assure the minimum bending radius of r = 230 mm is respected. Small bending radius will reduce the flow of the high-pressure hose. The bending radius should not be close to the fittings. Small Bending radius will make micro-cracks to the HP hose and eventually break apart. **Warranty** in this cases is not covering this fault.
- Make sure the high-pressure hose(s) do not come in contact with other parts and components of the test bench while operating.
- Always use the specified tightening torque during operation. Never overtighten the hose(s) connection in the occasion of a leak.
- Available logins: developer/dev1011, user/user1111, service/12345



Example: Developer

Example: User

Example: Service

AZO >> CR-Pump Screen Views

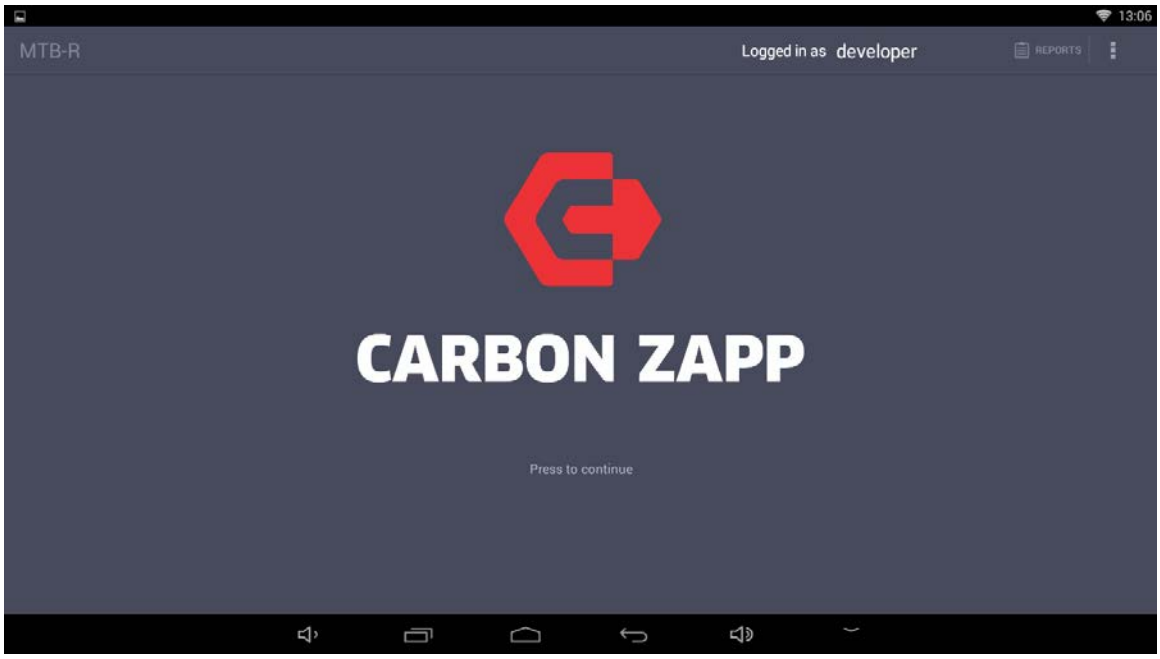


Figure 34: CR-Pump Sample Test - AZO ScreenShot#1

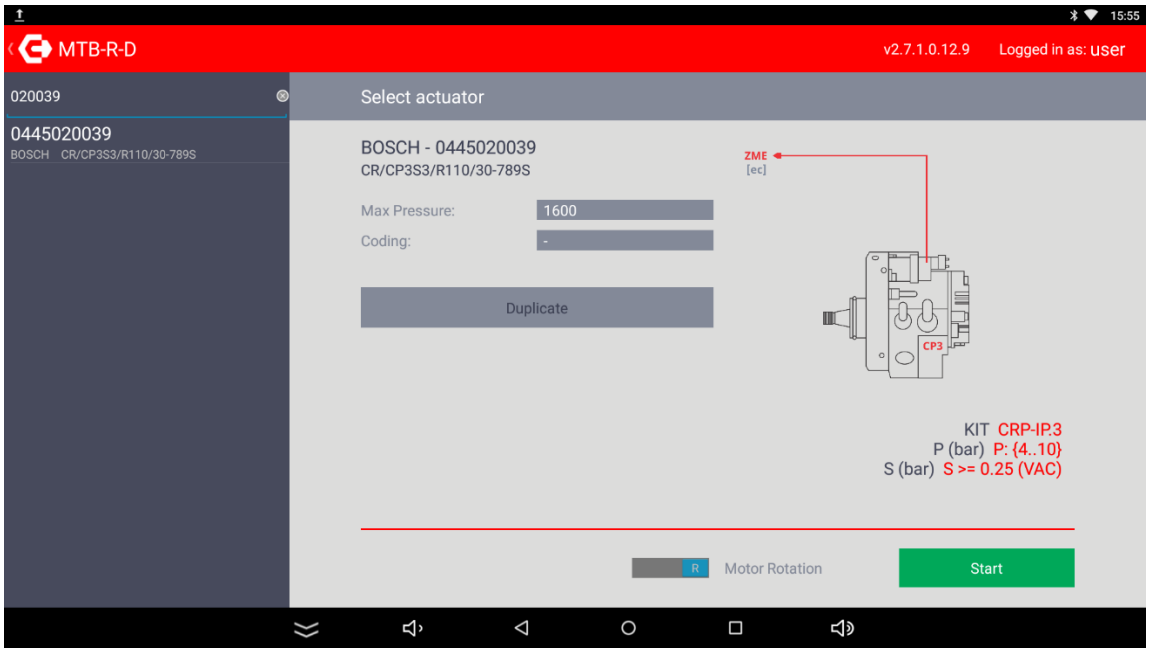


Figure 35: CR-Pump Sample Test - AZO ScreenShot#2

Figure 36: CR-Pump Sample Test - AZO ScreenShot#3

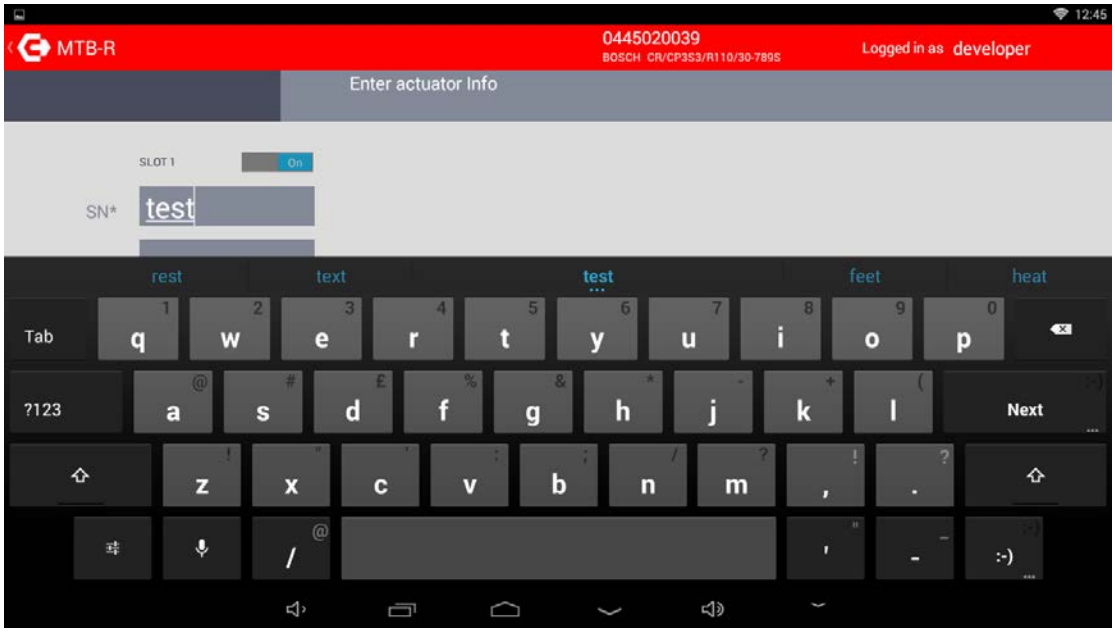


Figure 37: CR-Pump Sample Test - AZO ScreenShot#4

Figure 38: CR-Pump Sample Test - AZO ScreenShot#5

Figure 39: CR-Pump Sample Test - AZO ScreenShot#6

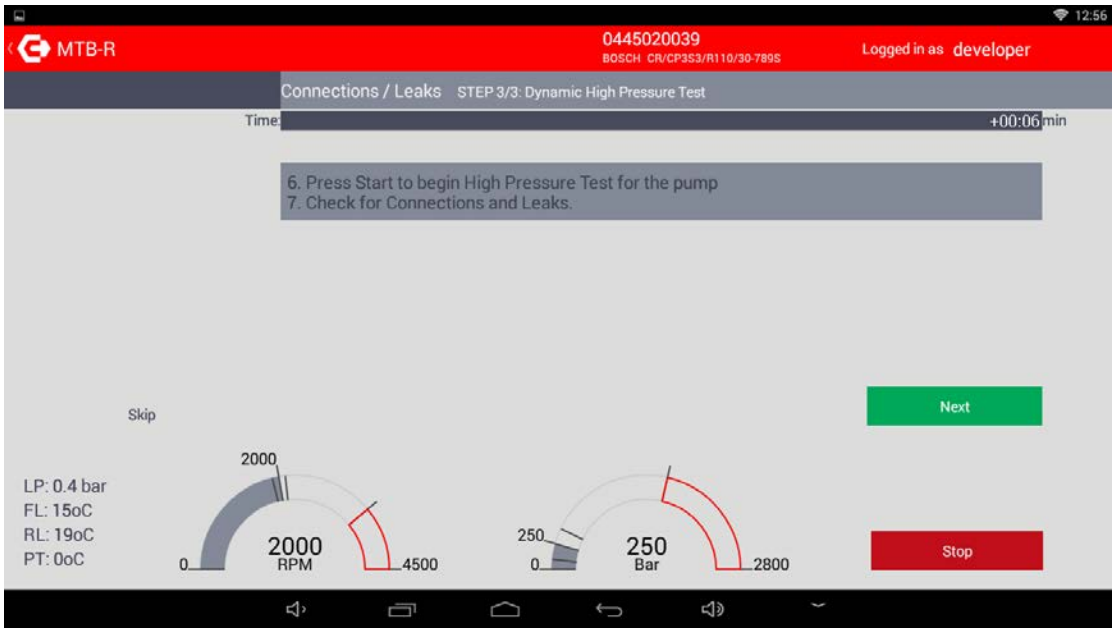


Figure 40: CR-Pump Sample Test - AZO ScreenShot#7

Figure 41: CR-Pump Sample Test - AZO ScreenShot#8

Figure 42: CR-Pump Sample Test - AZO ScreenShot#9

Figure 43: CR-Pump Sample Test - AZO ScreenShot#10

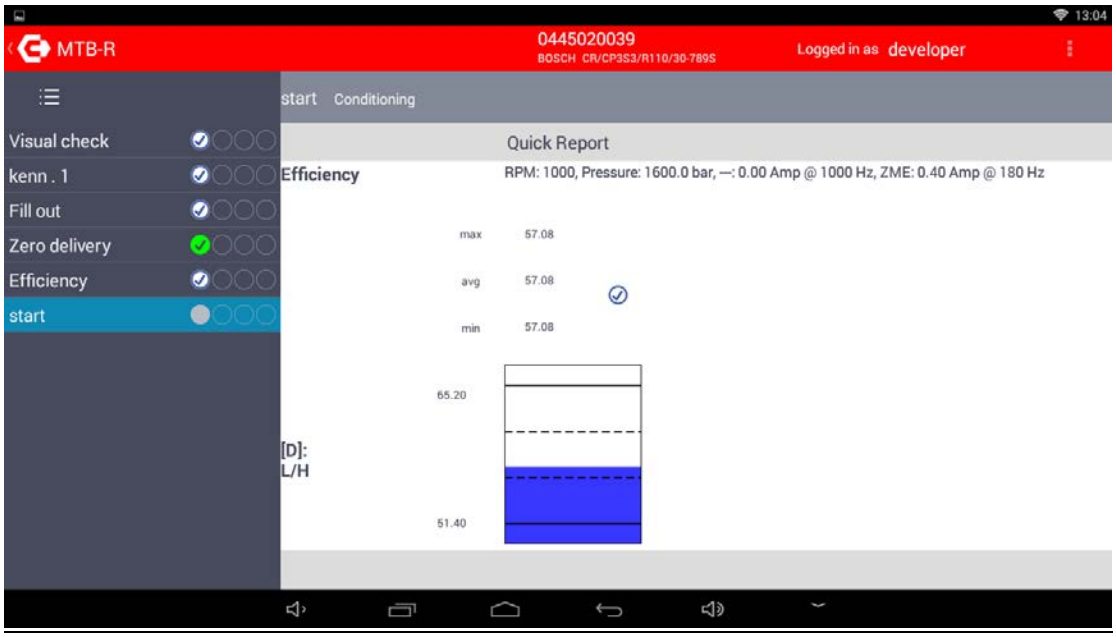


Figure 44: CR-Pump Sample Test - AZO ScreenShot#11

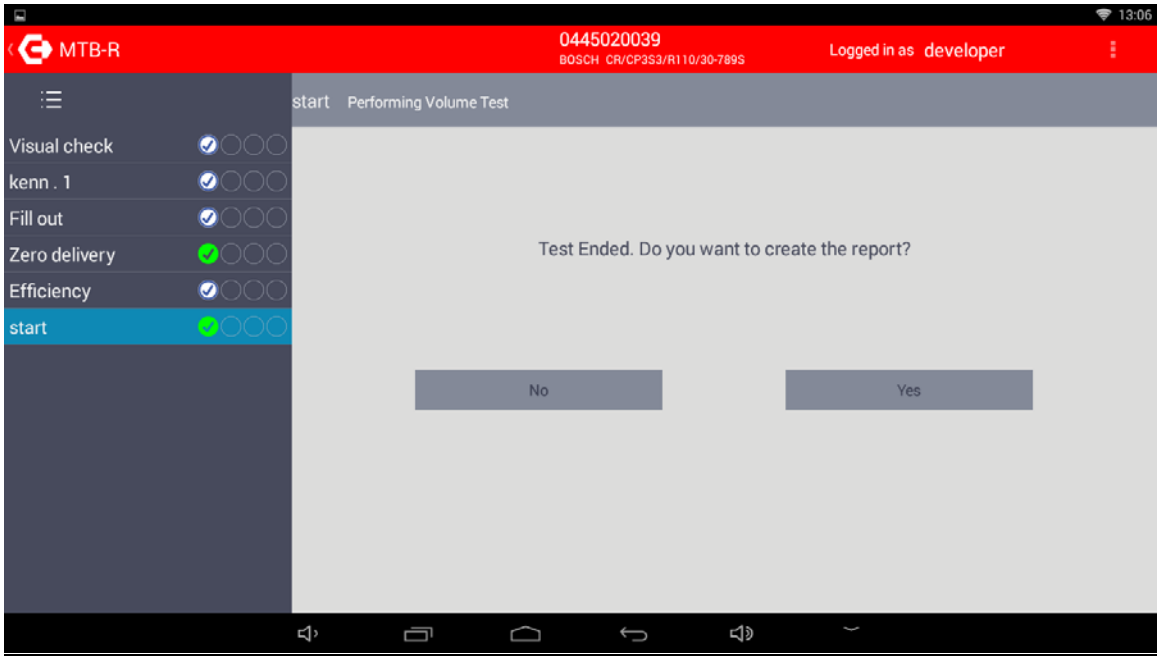


Figure 45: CR-Pump Sample Test - AZO ScreenShot#12

CRDi Installing & Testing

CRDi Kit Install

Figure 46: CRDi Kit Setup #1

Note: NOT included Common Rail Pump, we suggest 0445010081, 0445010090, 0445010107, 0445010125, 0445010213, 0445010343, 0445020037, 0445020039, 0445020105, 0445020026, 0445020057)

included Remove the CRDi Kit from Components box and place on the MTBr-D bench. Bolt down to the indicated position as shown above using the 4 screws.

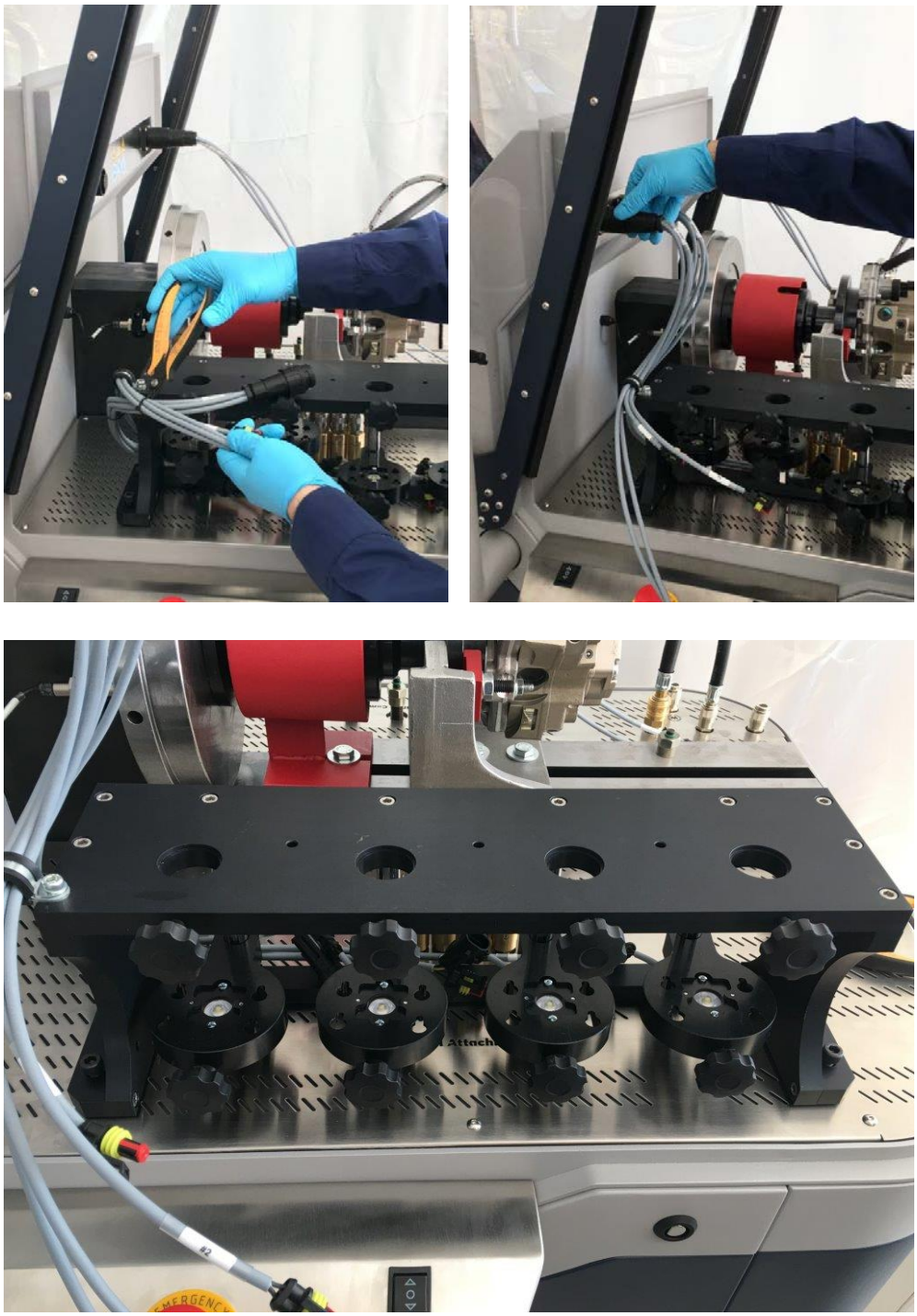


Figure 47: CRDi Kit Setup #2

Cut the plastic wire tie-wraps holding the injector wiring harness and connect to the MTBr-D unit as shown below.

Figure 48: CDRi Adapters Kit (Included)

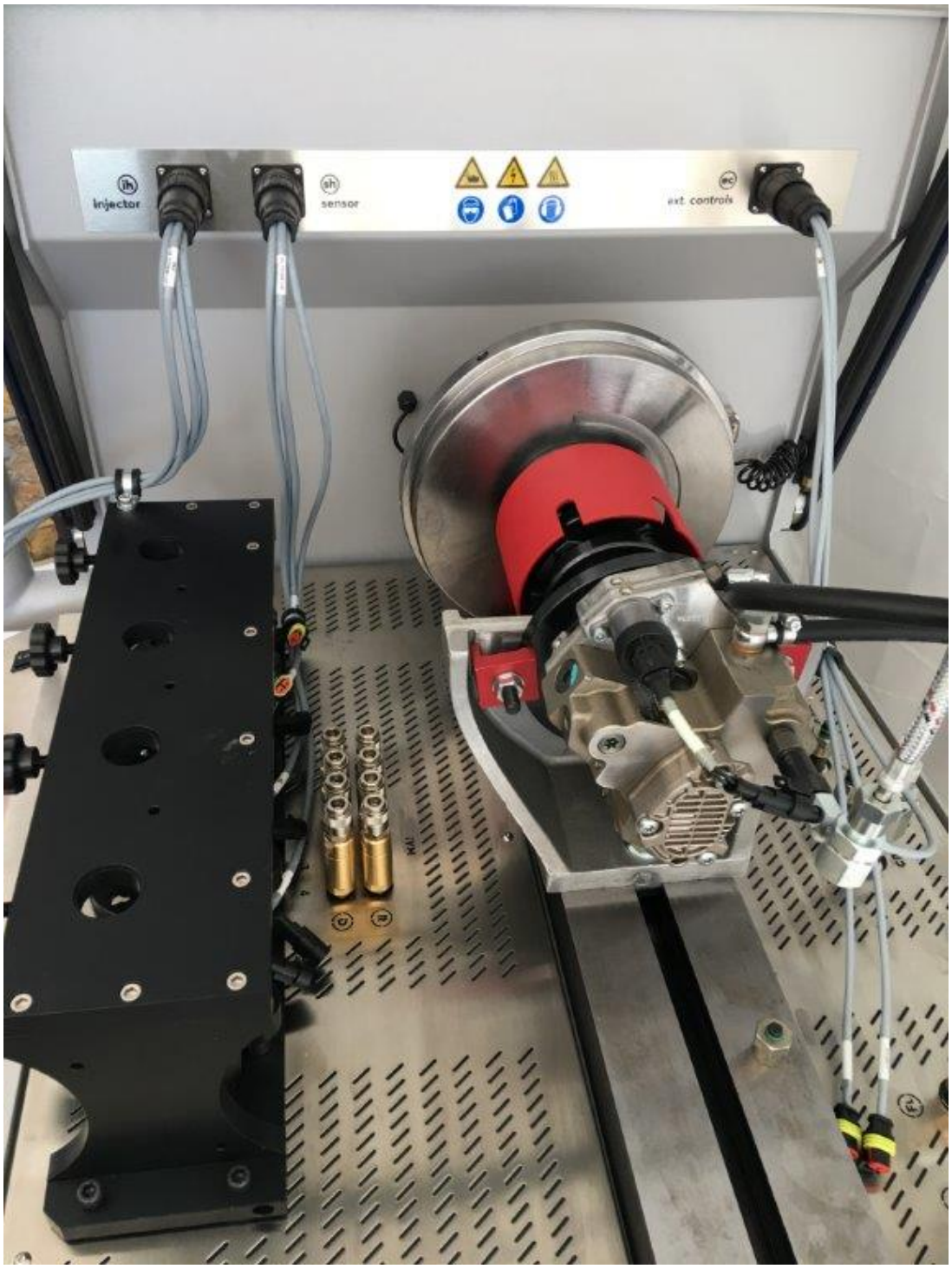
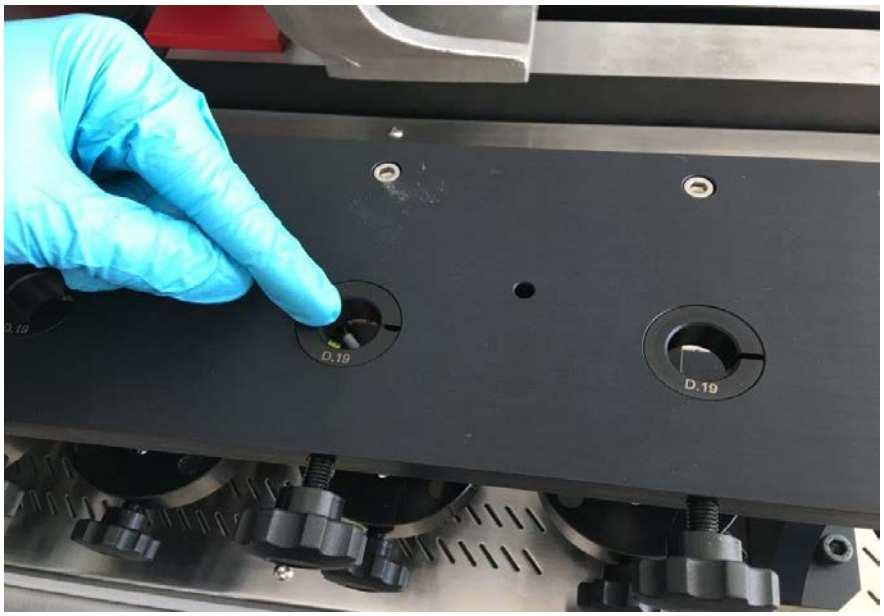


Figure 49: CRDi Kit positioned & connected on the unit

Use the proper shim size for the injector to be tested. Shims are available in diameters of 17-19-21mm



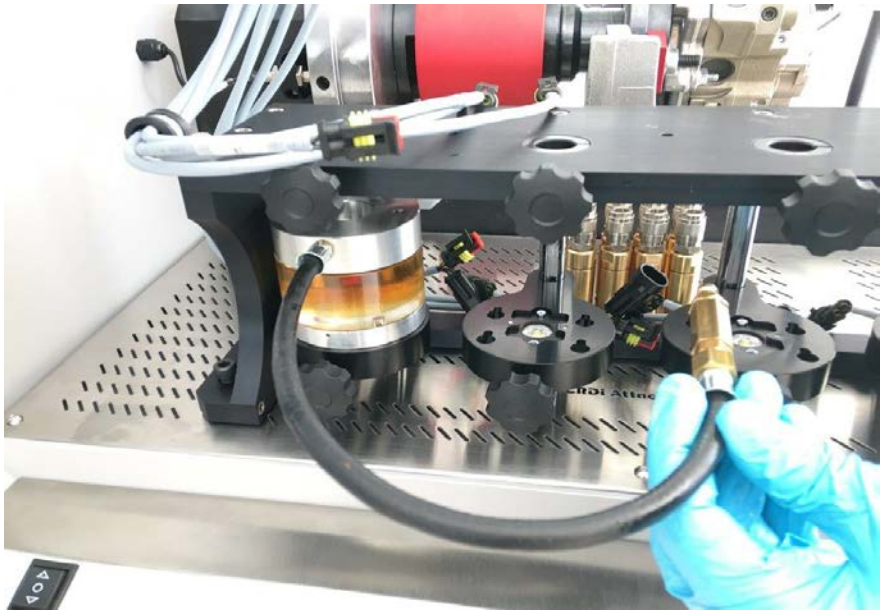


Figure 50: CRDi Kit Setup #3

Fill the iPSC Spray Chambers with new calibration oil and place in position as shown in the picture. Alternatively, use the correct RSP sensor for the specific injector nozzle.

NOTE: RSP adapters are a requirement for Injector Coding, RSP and aNOP tests.

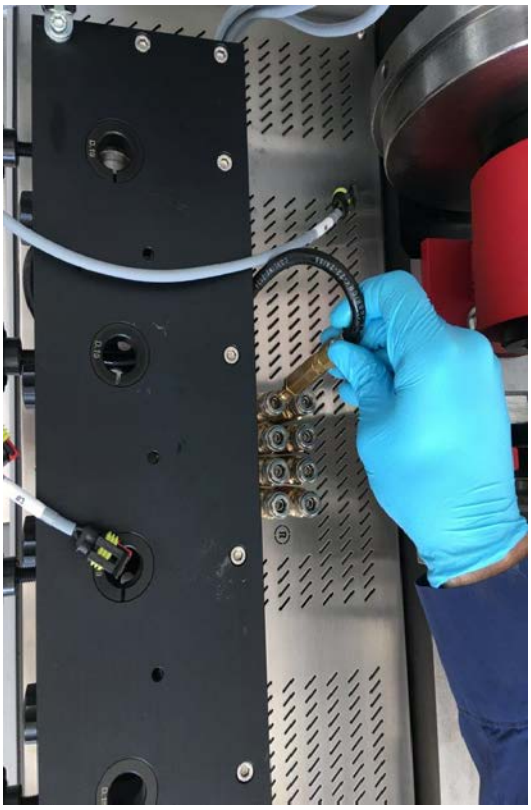


Figure 51: CRDi Kit - Slot Connection

Connect each Spray chamber to the correct numbered position of the Discharge slot.

Connect the numbered cables for Led lighting of the spray chambers to the wiring harness.

If RSP.04 response sensors are used, connect the sensor to the proper wiring harness similarly.

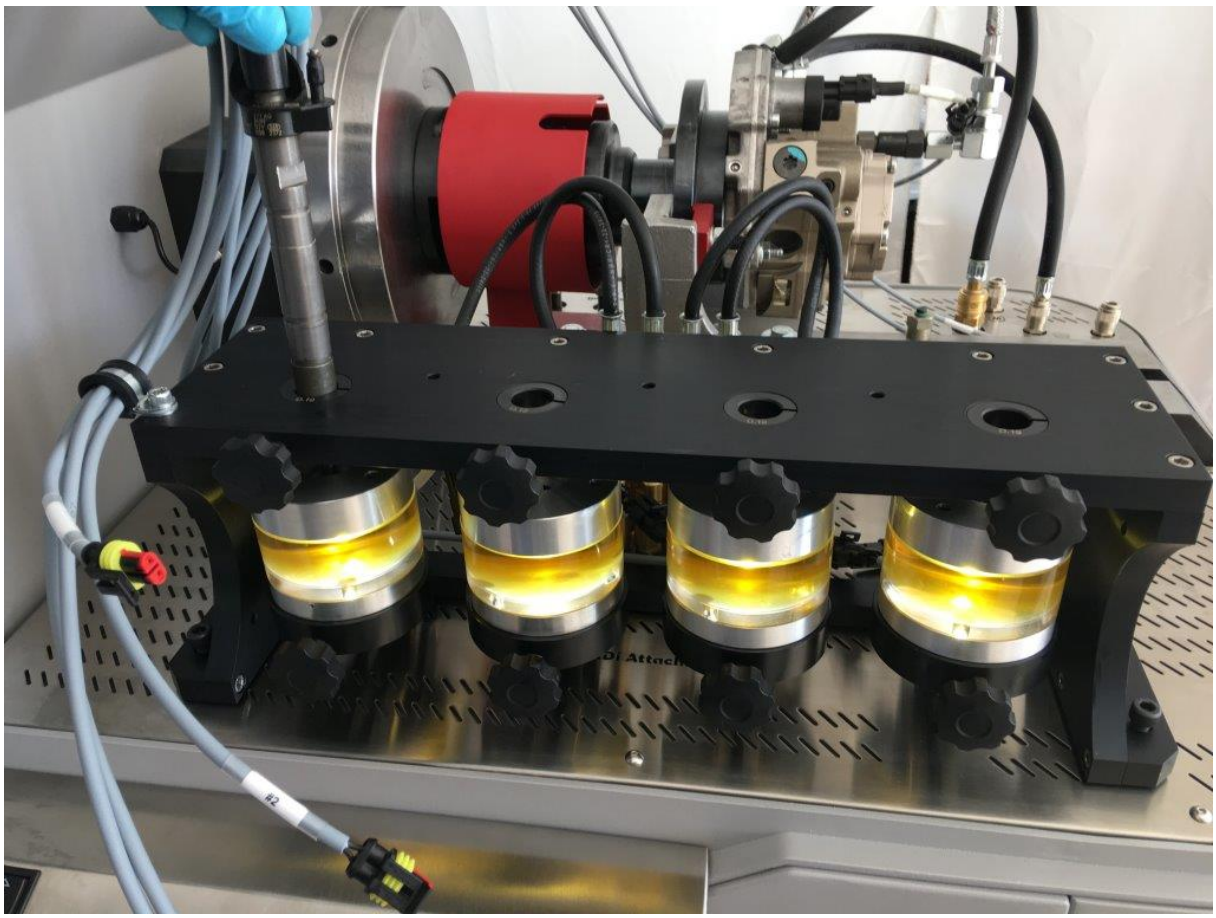


Figure 52: CRDi Kit - Fitting Injectors

Fit Injectors on the rail as shown in the picture.

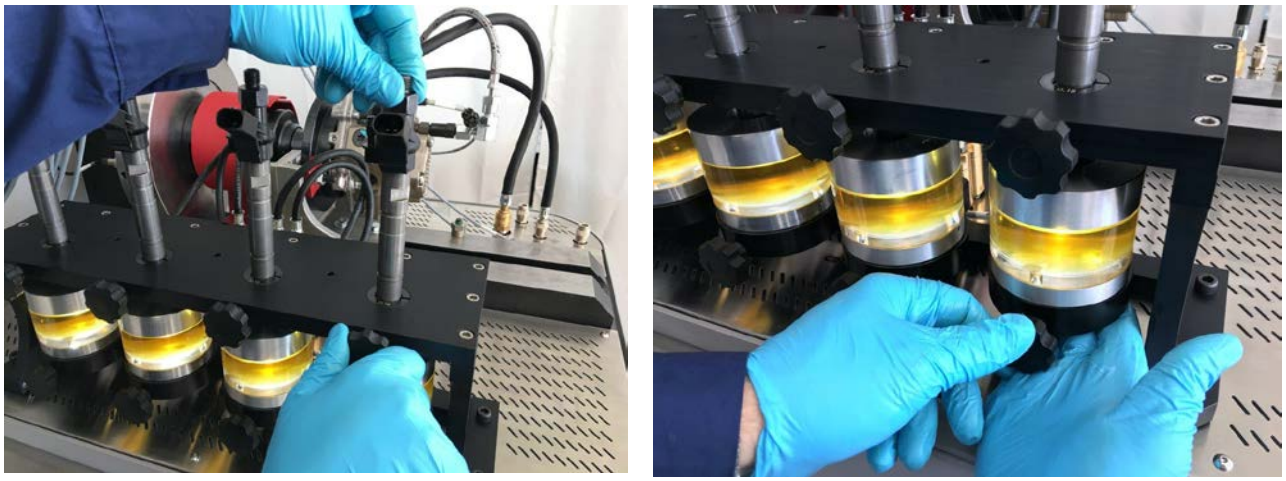


Figure 53: CRDi Kit - Securing Injectors and Discharge adapters

Press and hold down injector firmly while you hand tighten the injector holder knob in front of each injector.

Pull upwards against the injector the pressurized spray chamber and tighten the lower knob.

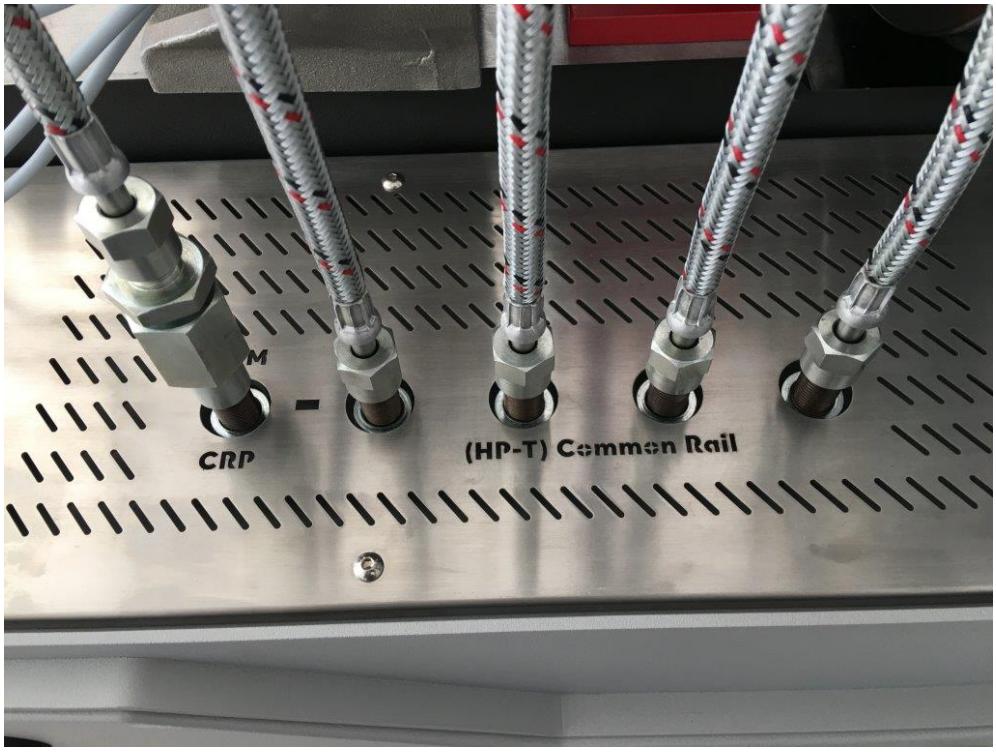


Figure 54: CRDi Kit - HP Hose Connection to unit

Connect the High Pressure Hoses supplied with the unit.

Remove the existing HP plugs and tighten the HP hoses (as many as you will use to test injectors).
Tighten at 25-30Nm

Connect the HP hoses to the injectors to be tested and tighten with 25-30Nm.

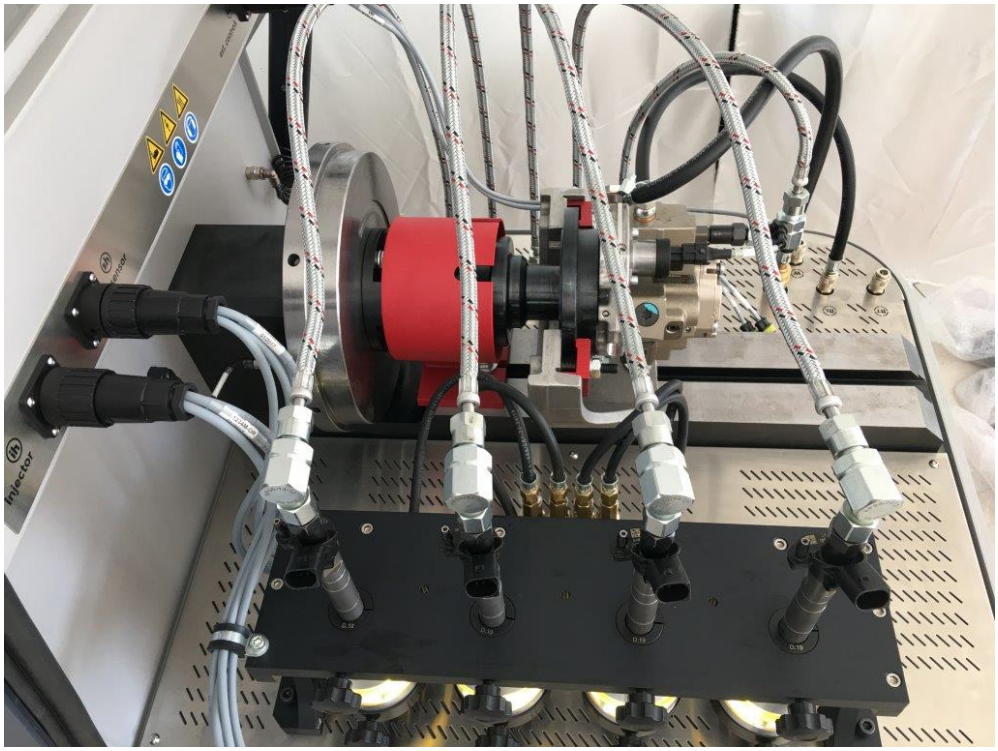


Figure 55CRDi Kit - HP Hose Connection to Injector

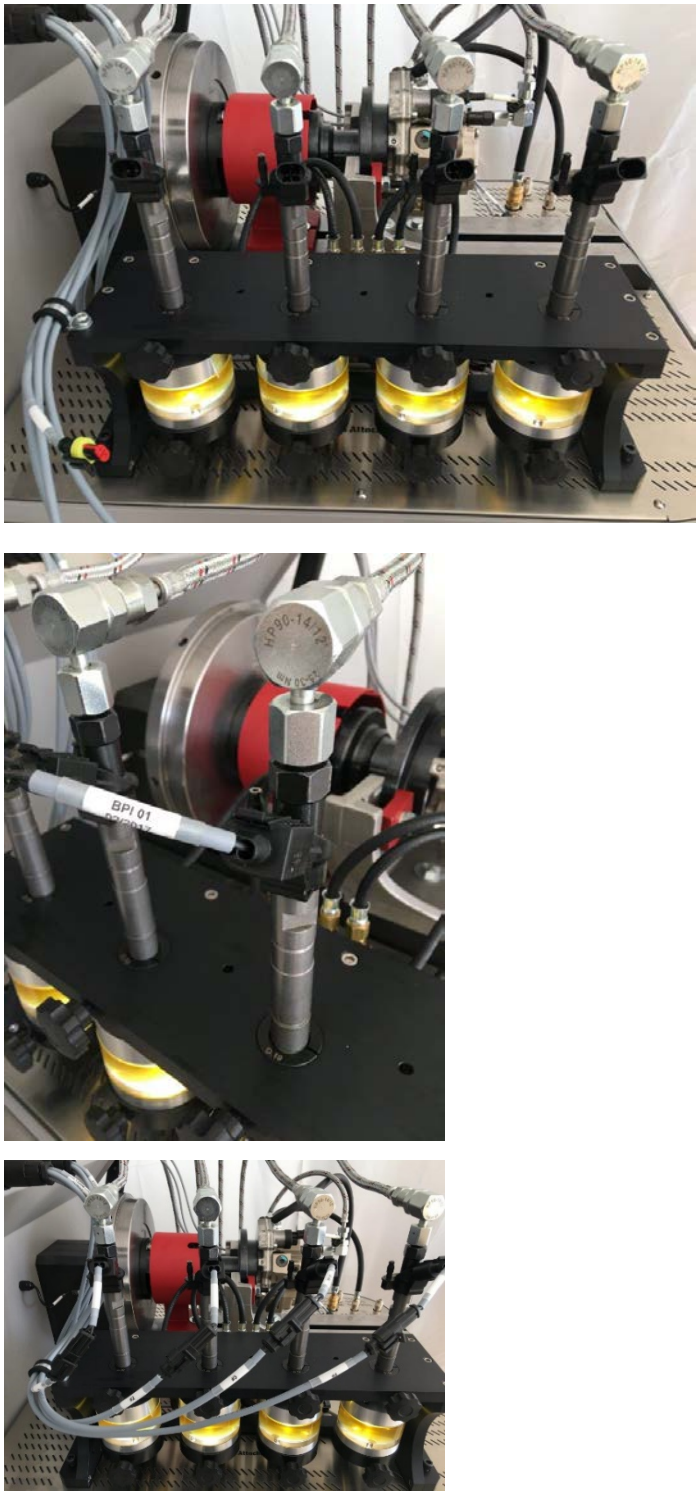


Figure 56: CRDi Kit – AZO >> Injector Electrical Connection

Follow the AZO software indication and choose the proper wiring connector for the injector to be tested.

Connect all of the injectors in the proper numbered wiring.

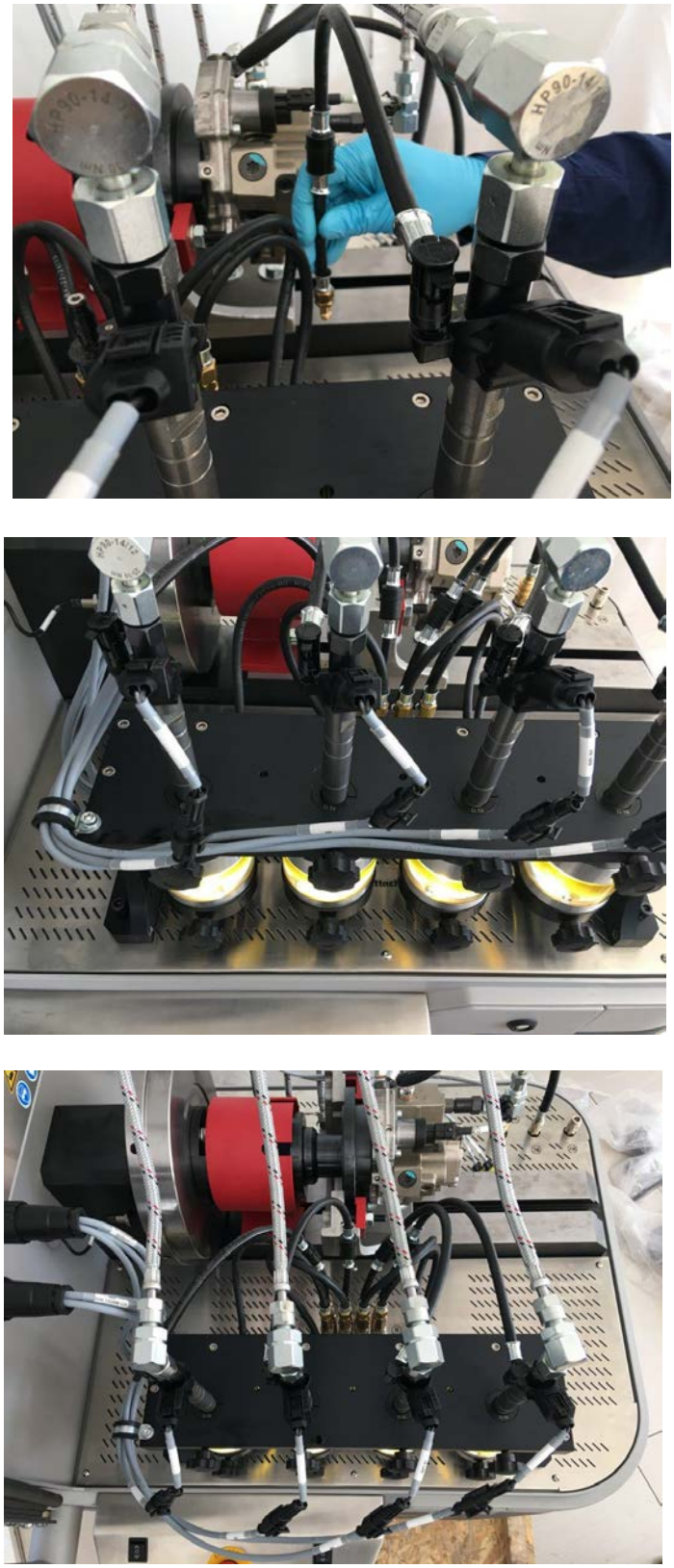


Figure 57: CRDi Kit - Injector Electrical Connection on Injector

Connect the return hose to the injector and then to the MTBr-D test bench Return input as shown.

Please note to choose the correct retun hose kit as indicated in the AZO software otherise you might fail in testing the injectors properly.

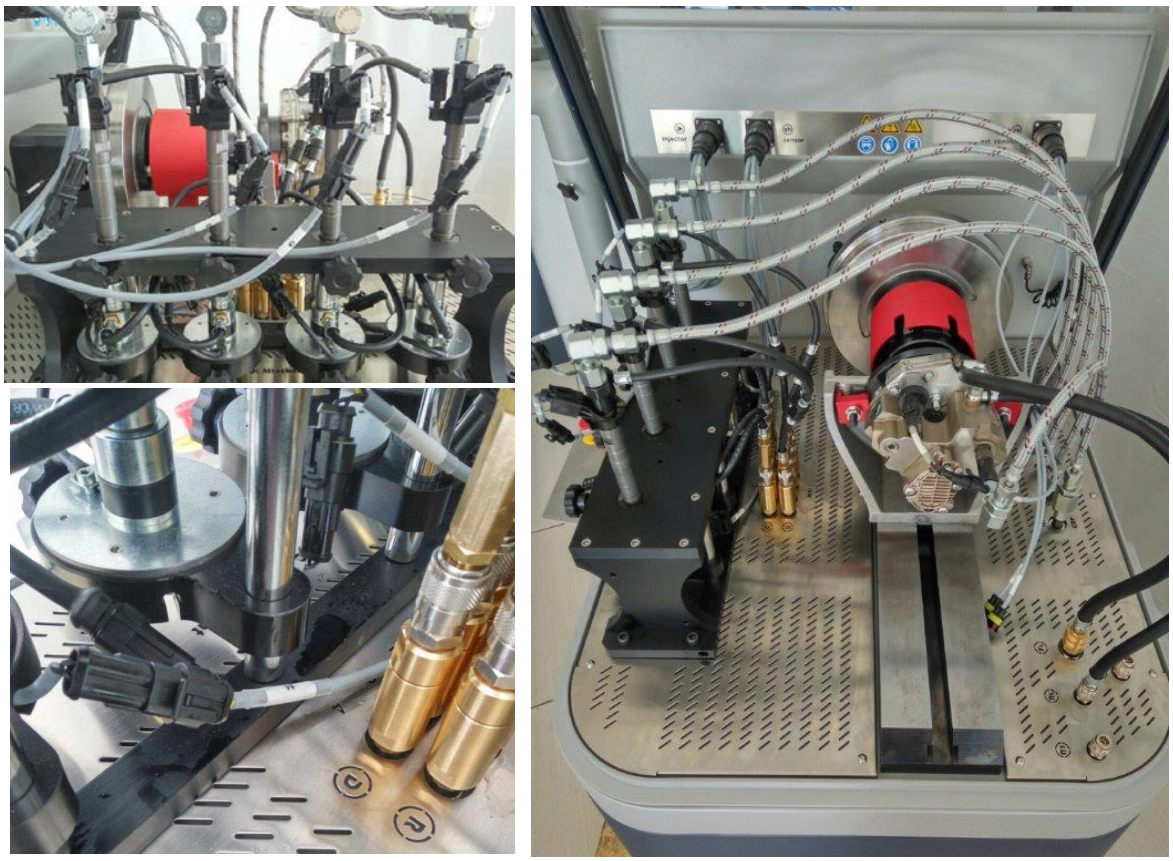


Figure 58: CRDi Kit - Injector Return Hose

AZO >> CRDi Screen Views

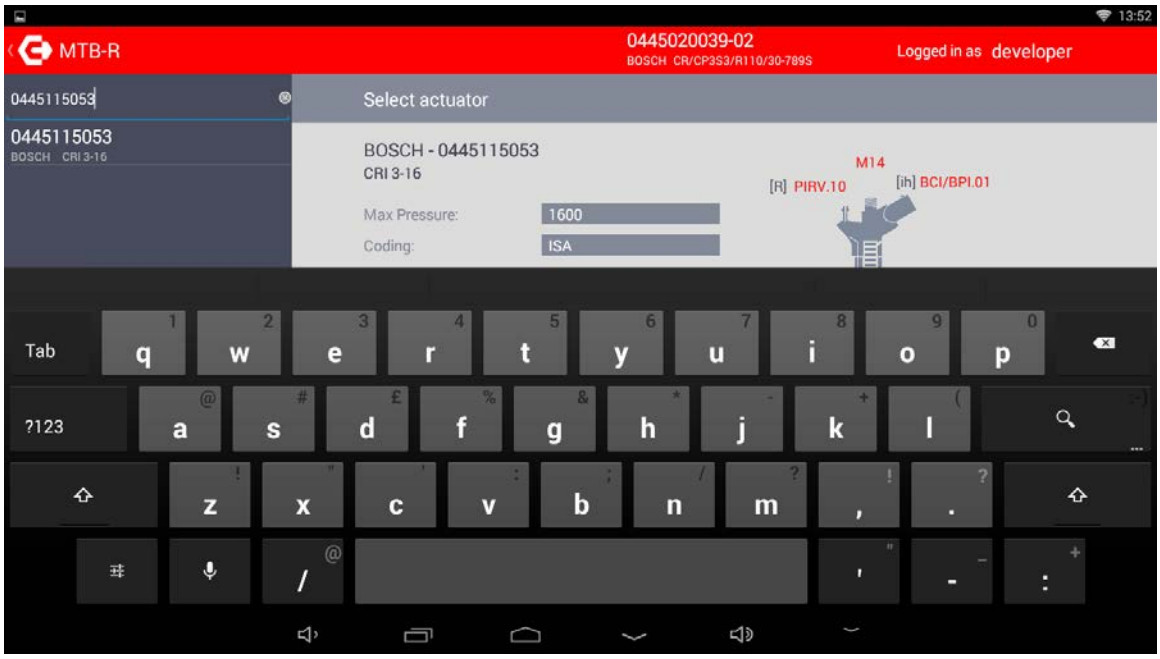


Figure 59: CRDi, AZO >> Injector Search

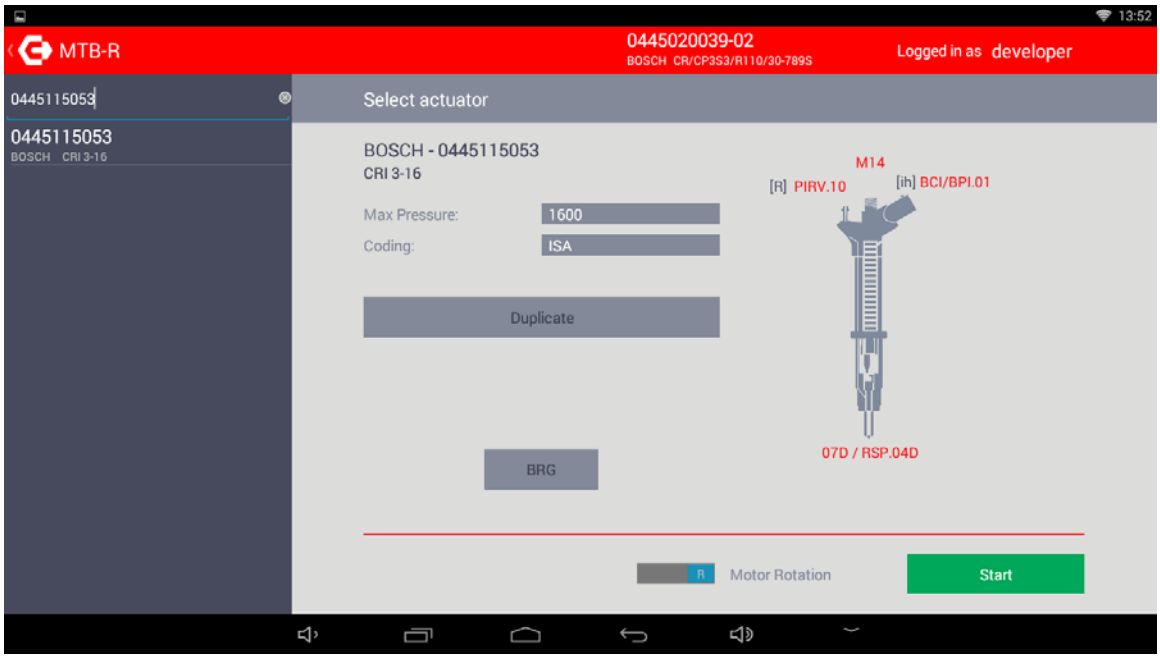


Figure 60: CRDi, AZO >> Injector Selection

Figure 61: CRDi, AZO >> Operator Info

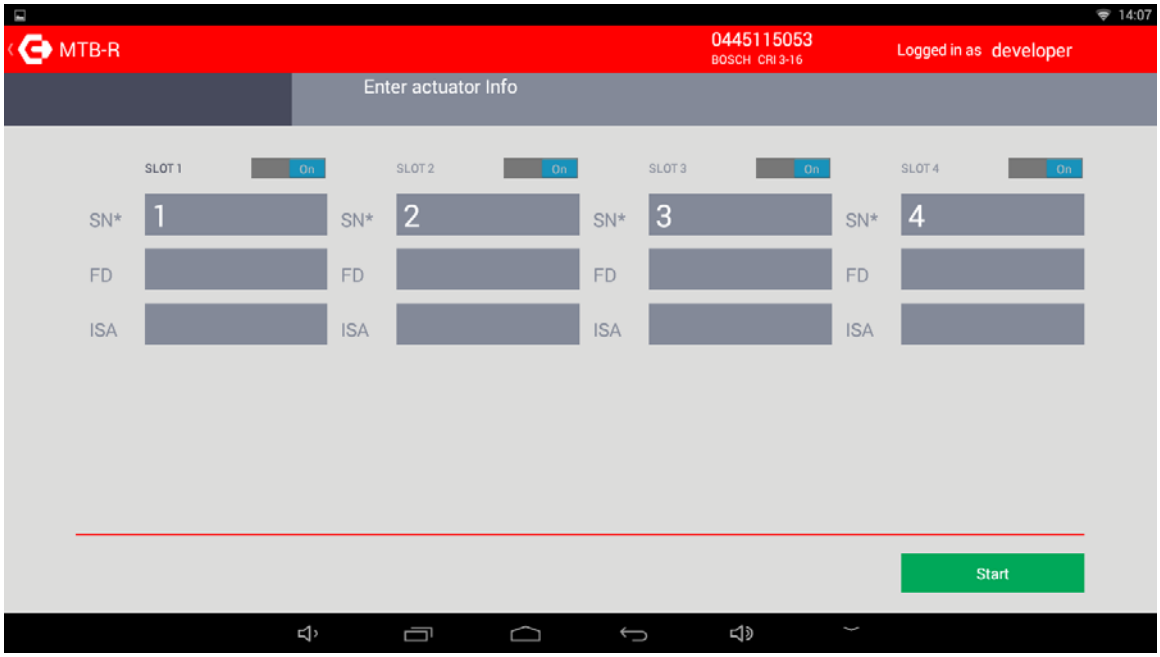


Figure 62: CRDi, AZO >> Injector Slot Setup

Figure 63: CRDi, AZO >> Injector CFL #1

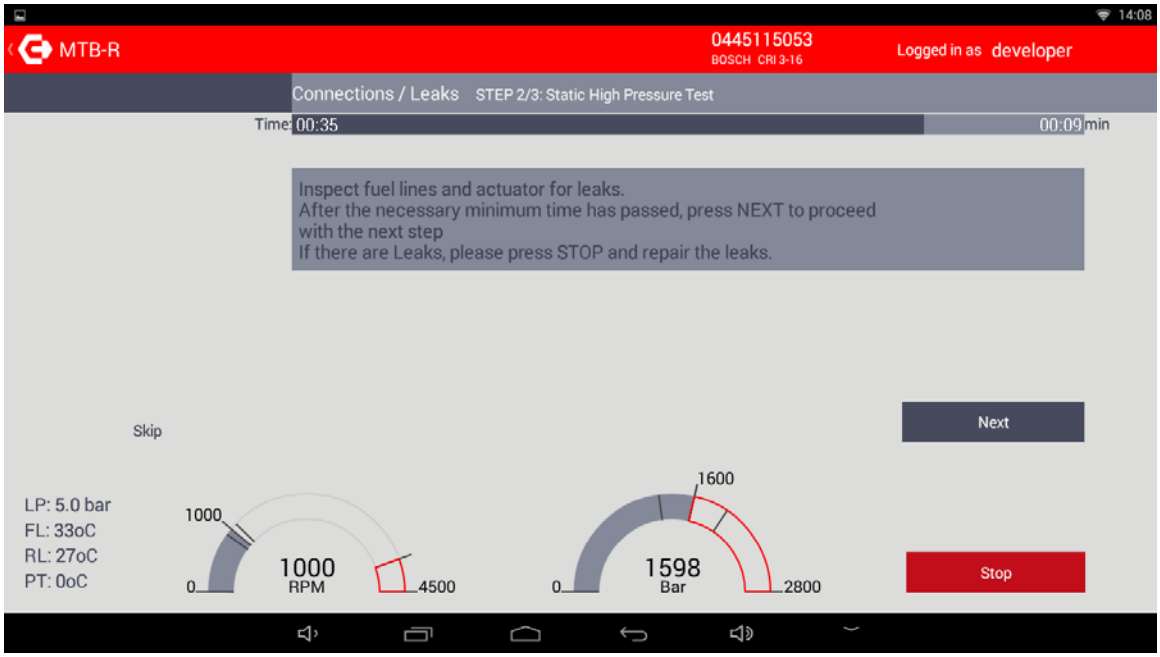


Figure 64: CRDi, AZO >> Injector CFL #2/#3

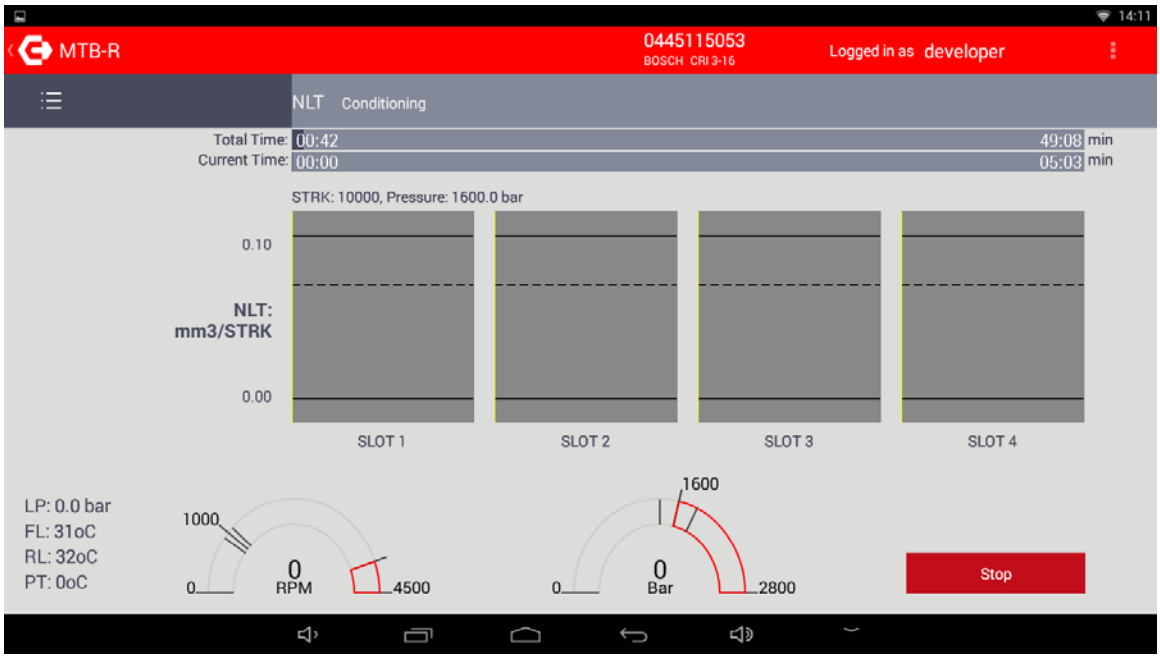


Figure 65: CRDi, AZO >> Injector NLT Test

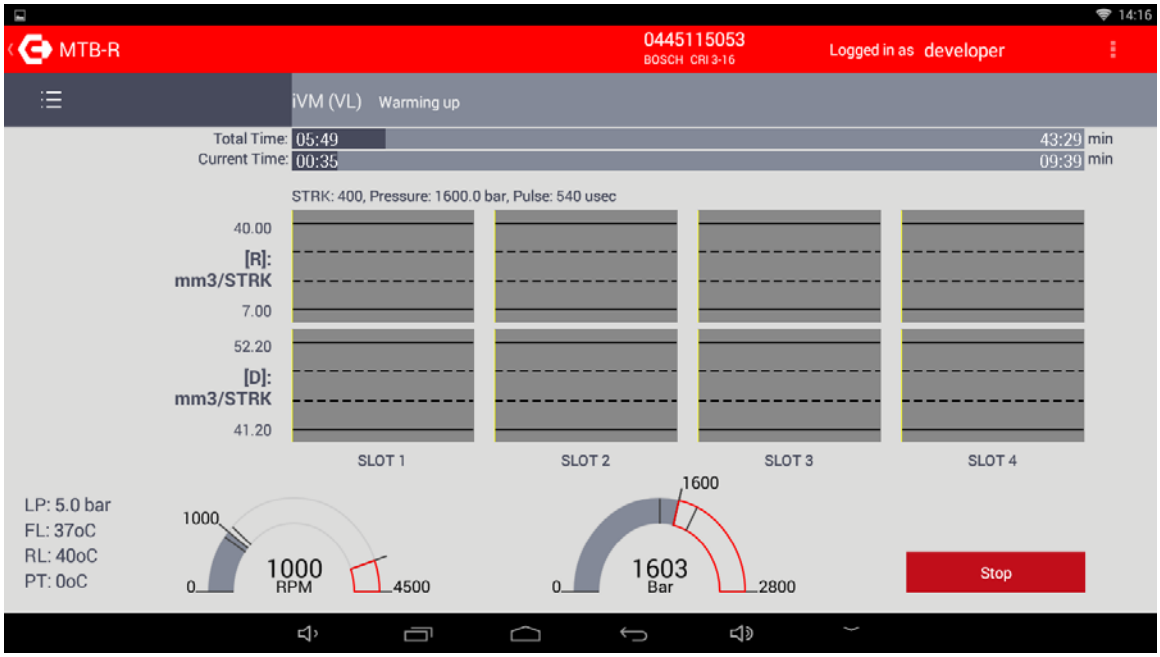


Figure 66: CRDi, AZO >> Injector Warmup test

Figure 67: CRDi, AZO >> Injector Sample Discharge test (iVM) - Conditioning

Figure 68: CRDi, AZO >> Injector Sample Discharge test (iVM) - Measuring

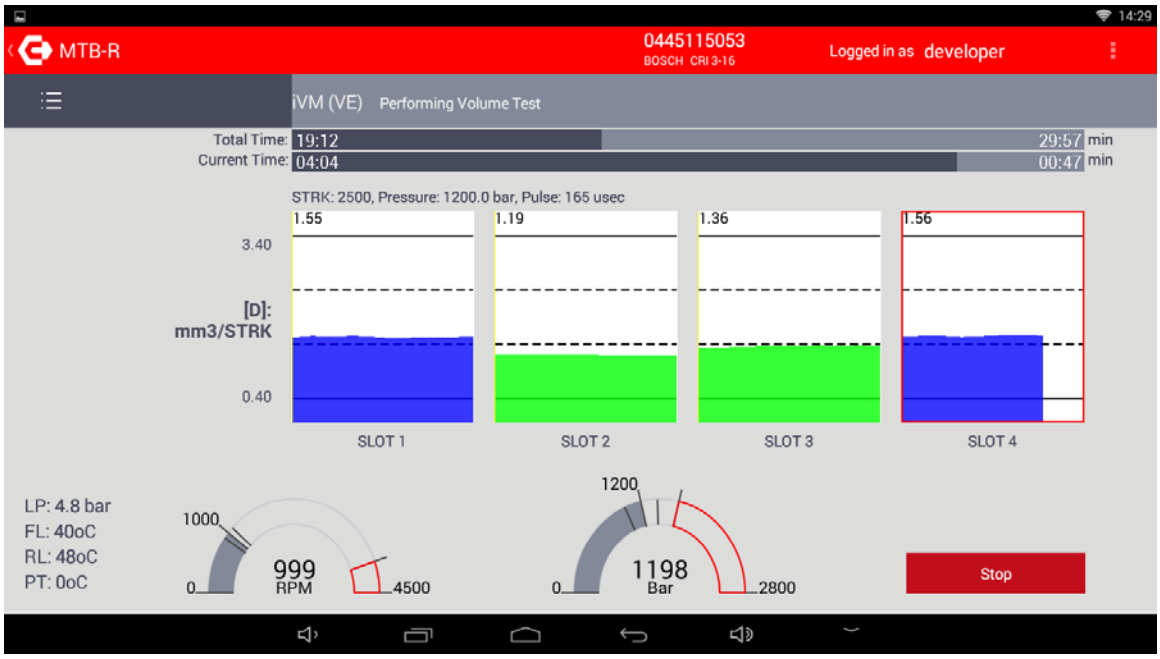


Figure 69: CRDi, AZO >> Injector Sample Discharge test (iVM) - Measuring (No Return) #1

Figure 70: CRDi, AZO >> Injector Sample Discharge test (iVM) - Measuring (No Return) #2

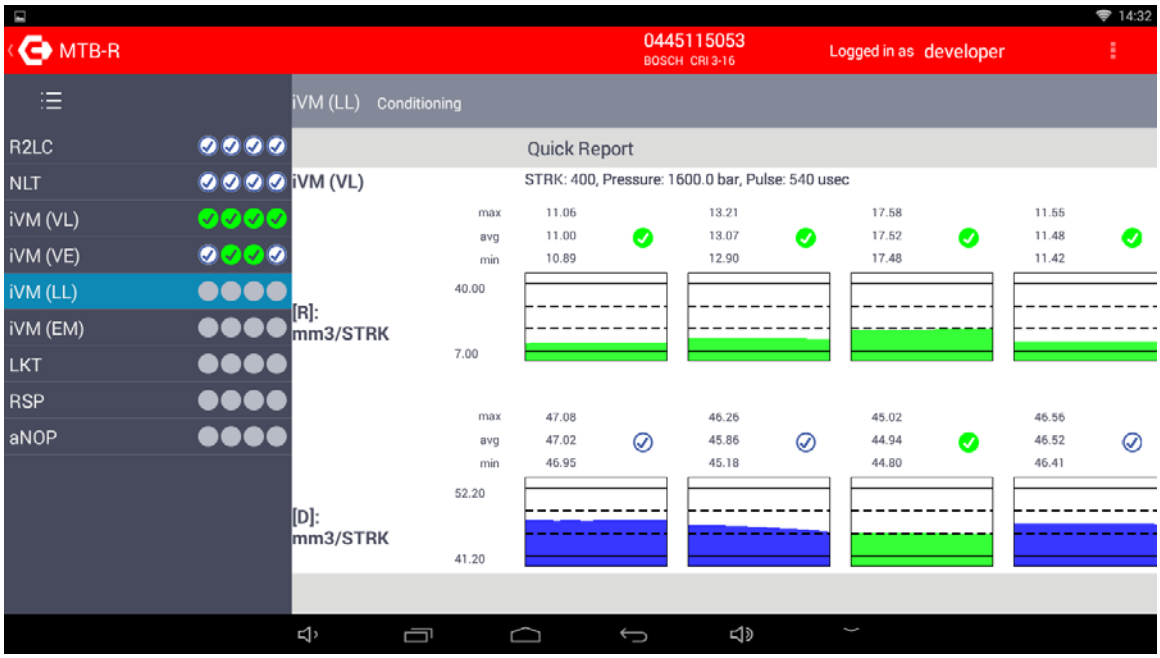


Figure 71: CRDi, AZO >> Tests - Quick Report

Figure 72: CRDi, AZO >> Live Oscilloscope

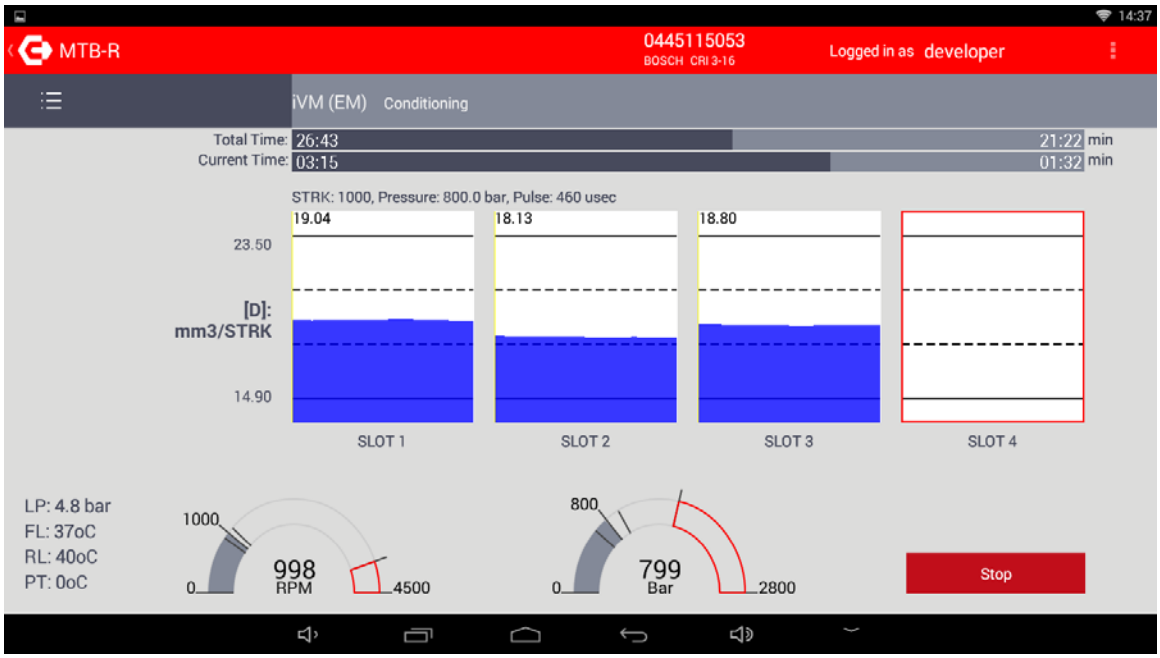


Figure 73: CRDi, AZO >> Injector Sample Discharge test (iVM) - Measuring (No Return) #3

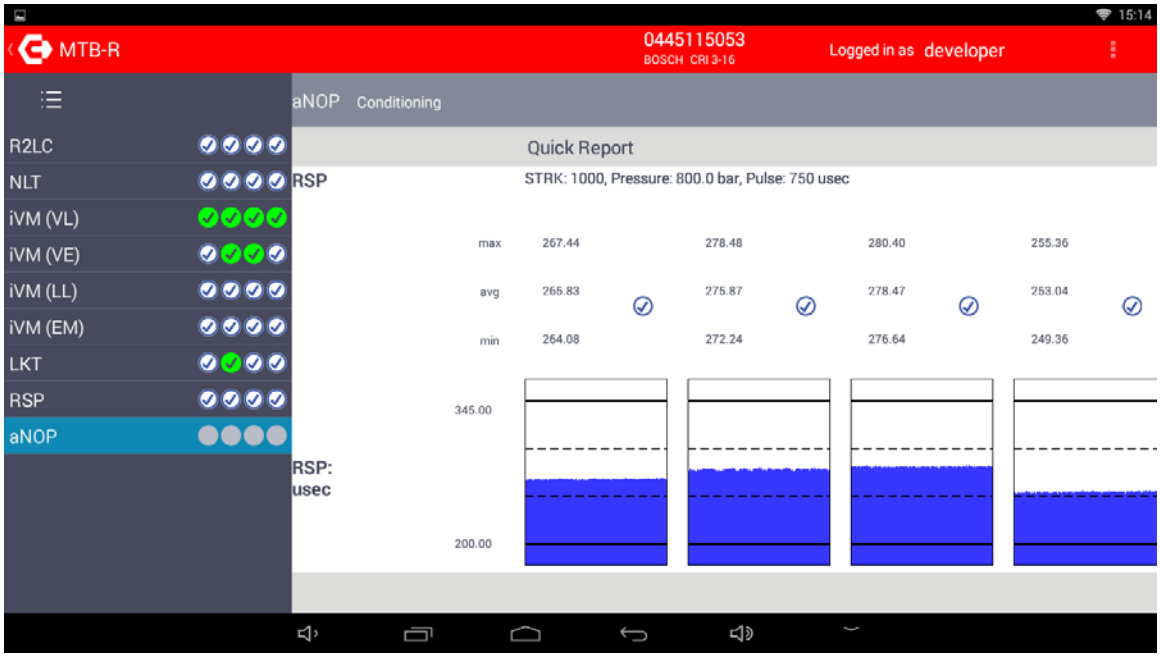


Figure 74: CRDi, AZO >> RSP Test

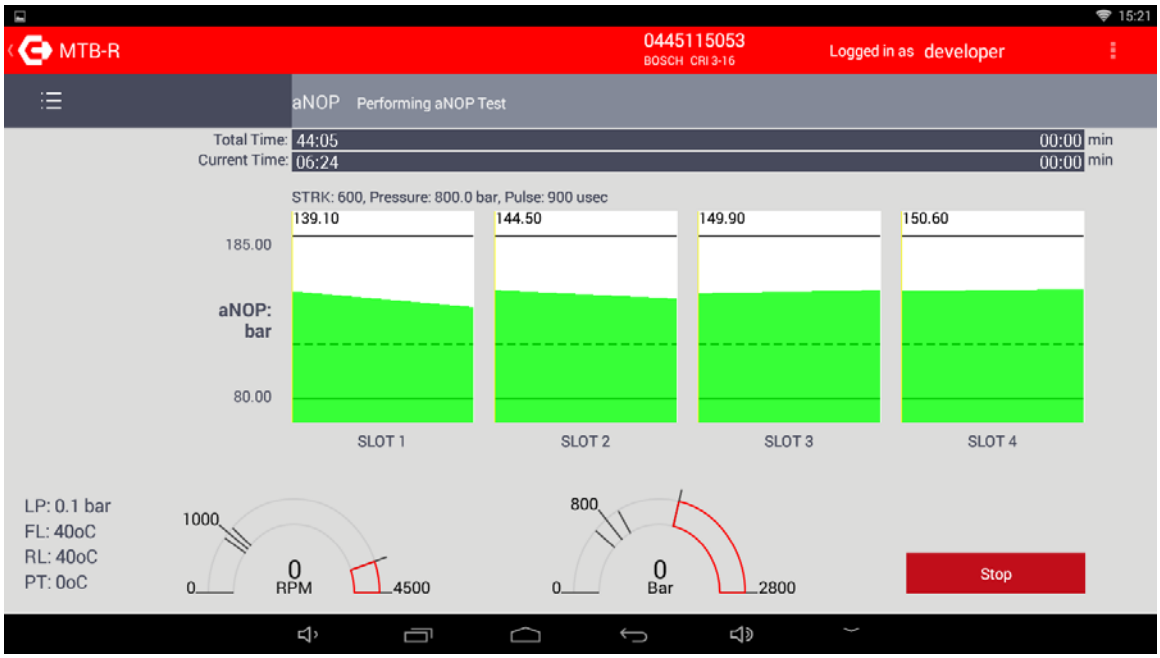


Figure 75: CRDi, AZO >> aNOP Test

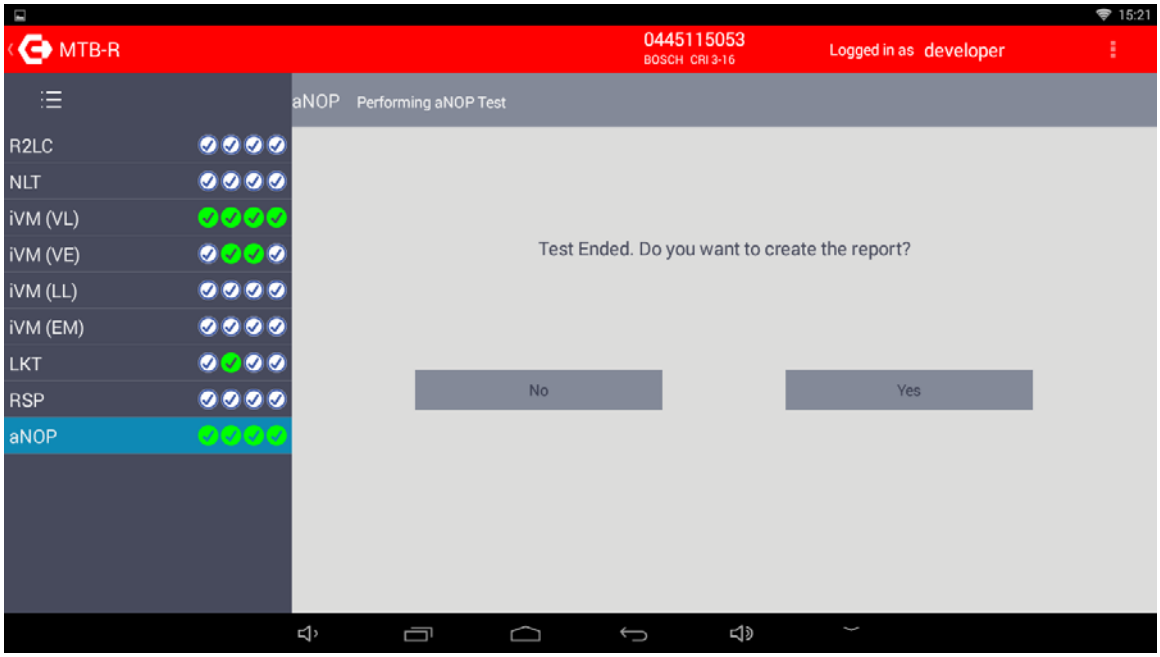


Figure 76: CRDi, AZO >> End of AUTO testing

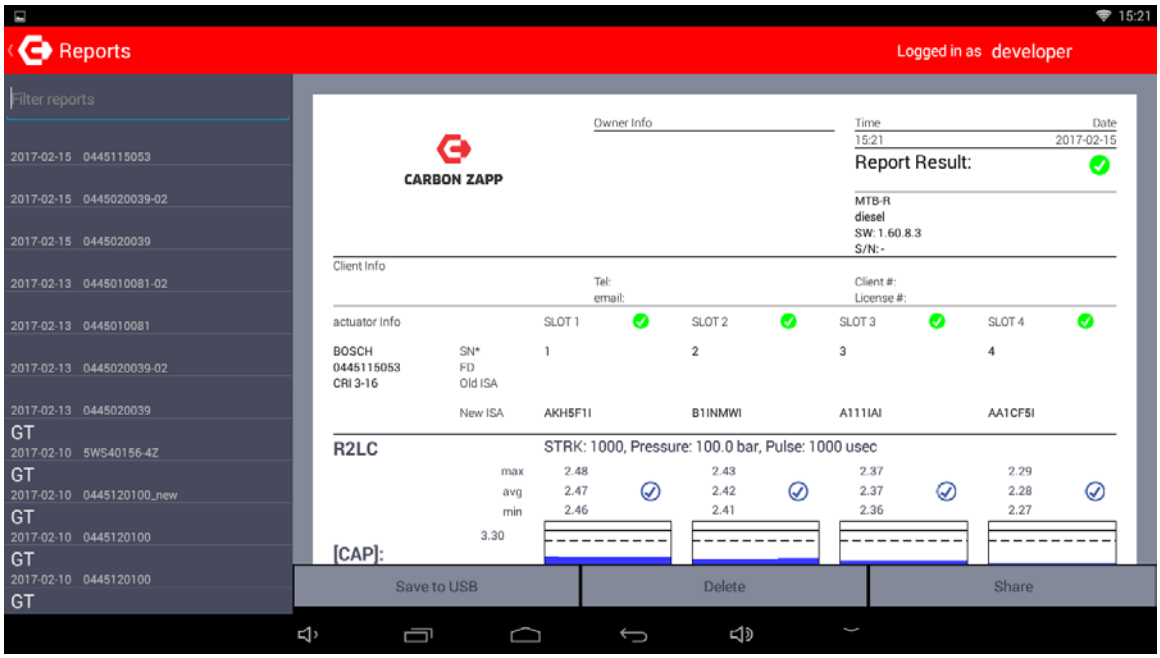


Figure 77: CRDi, AZO >> Screen Report

Maintenance

In-Line (Feed & Return Line) Filters

The provided filters are accumulating all dirt and contaminants coming from injectors to be tested in order to avoid the MTBr-D hydraulic system and sensors to get dirty. Inline filters need to be checked regularly on a weekly basis as indicated by the AZO software and to be replaced when dirty. Cleaning them instead of replacing them will VOID Warranty. Always check carefully the O-ring for correct sealing and re-assemble firmly.

Figure 78: In-Line Filters

High Pressure Filter

HP rail filter to be checked regularly on a weekly basis as indicated by the AZO software and to be cleaned with ultrasonics when dirty.

Figure 79: High Pressure Filter

Cooling System Air Filter

Air Filter should be rinsed and washed regularly for efficient operation of the unit. Depending on the workshop and environmental conditions, it is recommeneded to be performed weekly.

Figure 80: Cooling System Air Filter

DRV Maintenance

High Pressure Regulators (DRVs), should be removed and cleaned with Ultrasonics or replaced with NEW ones ONLY in the case that the pressure cannot be reached or stabilized correctly or the machine diagnostics indicate so.

NOTE: DRV'S ARE NOT COVERED UNDER WARANTY.

Tightening torque for DRVs is:

- **Tighten to 65Nm >> Release for 90º degrees >> Tighten to 85Nm**
- **DO NOT Exceed 110Nm**
- **DRV part number: Bosch 0 281 006 246**
- **DRV Washer Part number: Bosch 1 680 109 139**

Waste Tank Maintenance

The WASTE tank should be emptied when the software indicates to check the tank levels.

On the side of the tank (bottom left) there is a drain valve switch to open and drain the waste tank.

Pictures on the right indicate the change of filters. The oil pan below the filters should be drained by the switch shown into the waste tank.

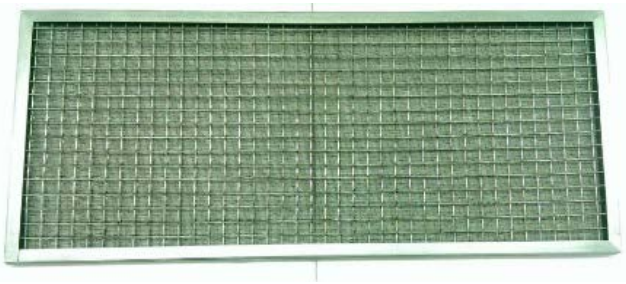
Figure 81: Waste Tank

Test Oil Tank & Filters Maintenance

- Do not to allow dirt into the calibrating oil.
- Do not use the oil from the Waste tank in the Calibration Oil tank.
- The calibrating oil tank can be drained via the drain switch in bottom front side the tank.
- Before filling with new calibrating oil, clean the calibrating oil tank by removing the cover on the top.
- The Oil tank capacity is 35 liters. Only use calibrating oil ISO 4113.

All Filters (3 items) should be replaced when indicated by the software, or according to the maintenance table below (whichever comes first).

Figure 82: Test Oil Tank & Filters

Ordering Part #	QTY /machine	Component Photo
CZ-008185	10	
CZ-002997	1	
CZ-003012	(1) Washable	
CZ-001047	2	
CZ-002602	2	
CZ-002080	3	

Servicing

- MTBr-D unit requires maintenance at regular intervals for efficient operation.
- The maintenance intervals are based on 8-hour operation daily.
- Please follow the maintenance intervals and messages prompts the AZO software provides.
- For advanced diagnosis or if needed to calibrate unit, please refer to your Carbon Zapp dealer.

Maintenance work	0	1	2	3	4	5
Check high-pressure hoses	–	–	–	–	–	x
Check hoses	–	–	x	–	–	x
Change calibrating oil, clean calibrating oil tank	–	–	x	–	–	x
Drain dirty oil in stowage space of work area	–	x	–	–	–	x
Replace the In-Line Filters	x	–	–	–	–	–
Cleaning the cooling air filter	–	–	–	–	x	x
Replace high-pressure rail filter	–	–	–	x	–	x
Replacing the volume meter filter	–	–	–	–	x	x
Check accuracy of temperature and pressure measurement	–	–	–	–	–	x

Maintenance intervals

0 Weekly or per channel after test of 30 cleaned common rail injectors
1 Weekly
2 After 200 common rail pump tests or 1500 injector tests; after 2 months at the latest
3 Every 6 months; or after 1250 hours or if prompted by software.
4 Yearly or after 2500 hours or if prompted by software.
5 On main inspection by Customer. Service every 2 years.

After each filter replacement, the filter change must be reset in the "Maintenance Menu" in the AZO software

Appendix

Technical data

MTBr-D	Specification
Rated three-phase voltage	380 VAC – 440 VAC
Rated current	32 A
Fuse	35 A

Function	Specification
Number of phases	3P (L1/L2/L3/N/PE)
Input frequency	50 Hz / 60 Hz
Rated power	9 kW
Storage temperature	5 °C – 60 °C
Operating temperature	5 °C – 35 °C
Ambient temperature	10 °C – 35 °C
Maximum permitted relative humidity	≤90 % (at 25 °C and
Maximum Oil pressure	2800 bar
Maximum speed	6000 rpm
Control voltage	24 VDC / 100-240 VAC

Noise emissions

The noise emission of the MTBr-D during operation depends on the component to be tested. An average of 65-75dB is estimated for the MTBr-D.

Function	Specification
MTBr-D (D x W x H) Protective Hood / Tablet Closed MTBr-D (D x W x H) Protective Hood / Tablet Open MTBr-D Packaged (D x W x H)	85 x 90 x 162 125 x 140 x 200 106 x 115 x 188
Weight of MTBr-D (with packaging) Weight of MTBr-D (without packaging)	520 kg 465 kg

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