

HMS 3arm® Tool Balancer Operator Training Package

To Suit: 3arm Tool Support System Castor Wheel M7 - *HMS Item Code 00519-01*



Introduction

HMS Equipment & 3arm® have developed a tool balance solution to ensure that when using heavy tools on large mine equipment tyre change applications, the tools are balanced leaving the operator free to loosen, tighten and apply the correct torque to the wheel nuts without the risk of musculoskeletal injury.

This operator training document will outline the correct operating procedure and highlight all the safety features of the system.

Failure to apply these procedures may prevent the system from working correctly and or cause injury.

Disclaimer

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Safety



Before commencing work, complete a site-specific JSA to check that no abnormal conditions exist.

Risks and Major Hazards



Consider unused air pressure and potential stored energy before using this equipment.



Consider pinch and crush points before using this equipment.



Consider interaction between people and site mobile equipment, ensure you adhere to all standing zones and mine managers rules

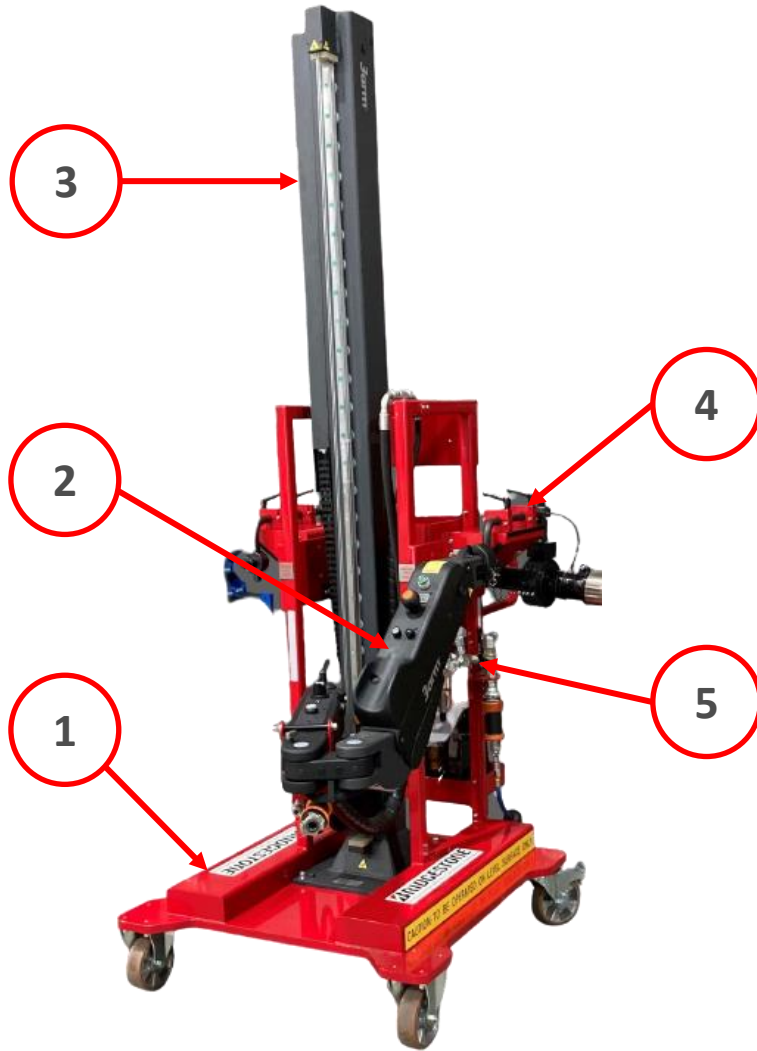


Follow site-specific PPE requirements



Follow the site-specific requirements when working off a platform or ladder

General Overview – HMS 3arm® Tool Balancer



Main Parts:

1. Trolley Frame
2. Arm
3. Column
4. Tool Support Assembly
5. Air Supply Pneumatic Assembly

Step 1 – Pre-Start Operational Checks

 **Complete the following steps below before connecting the air supply to the system**

- Report to your supervisor for job instructions and maintenance manuals before operation.
- Ensure that the tools are secured in their supports and clamped.
- Visual inspection of the system for damage.
- Ensure the castor wheel brakes are operational.
- Ensure that the vertical linear rail of the 3arm mast is free from corrosion and is well lubricated
- Ensure that the arm is attached to a tool and that the second tool is set in the correct position to facilitate tool change when required. *Note that the securing and locking devices are correctly applied and the correct tools are in place.*



Image – Tool Holder Support Assembly



Image – Tool Holder Support Assembly

Step 2 – Connecting the Air Supply

- ✓ Connect mains air supply
- Open the valve to allow air into the 3arm system

Check:

1. Indicator on the arm has changed to green
2. Main system air supply gauge is working and correct
3. Tool regulator gauge is working and correctly adjusted appropriately
4. Arm regulator gauge is working. Note this will be pre-set from HMS.
5. Mast / Column Regulator gauge is working. Note this will be pre-set from HMS.



b) Main System Air Supply gauge

2. Turn air on here

1. Connect mains air supply here

c) Tool Air Supply gauge



a) Air Supply indicator will be green when on



d) Arm - Air Supply regulator gauge

Step 3 – Tool Removal

1. To remove the 3arm headmember from the tool support, ensure the arm is lowered to the base of the column until there is no vertical downward travel remaining. Then release the two clamps.



Both clamps need to be unclamped to lift the tool up and out

2. Next, use the vertical Column controls (located on the arm or column) to slowly raise the 3arm headmember clear of the supporting clamps and supporting frame.
3. Swing the Arm clear of the supporting tool ready for operation.

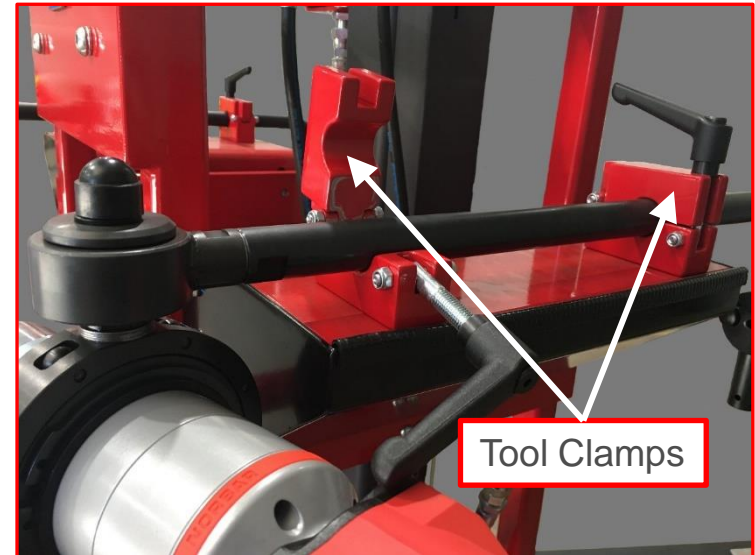


Image - Showing one clamp in the unclamped position and one in the clamped position.

Step 4 – Arm Operation: Regulation of Supply & Working pressure

Supply Pressure

Adjust air supply pressure according to the working conditions, using the pressure **regulator R1**.

1. To adjust the regulator, push up on the knob edge to unlock the anti-rotation mechanism.
2. Turn the handle (R1) to the left or right to adjust the pressure (max. 0.85 MPa).

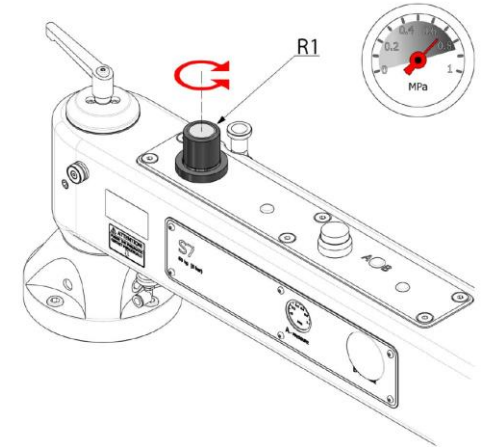


Image – Supply Pressure Reg

Working Pressure

The objective of this regulation is to keep the tilting arm balanced and therefore achieve the weightlessness of the system adapted to the tool load and working conditions. To do this, operate the **R2 regulator**.



Refer to the 3arm Manual for recommended supply and/or feed pressures to suit your required tooling weights.

1. To adjust the regulator turn the knob (R2) to the left or right

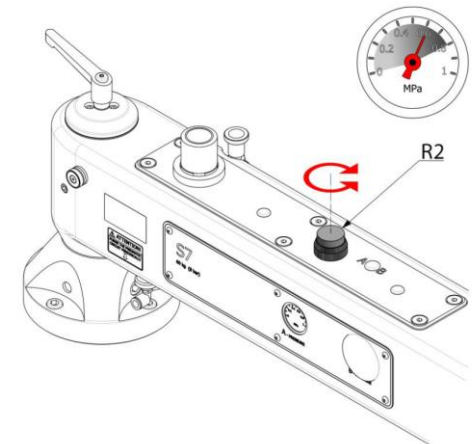


Image – Working Pressure Reg

Step 5 – Column Operation

To achieve your necessary tooling or Arm height, press and hold down the up or down buttons until it reaches the appropriate position.

This can be controlled either from the Column controls (1) or the Arm controls (2)

1. Column Controls

2. Arm Controls

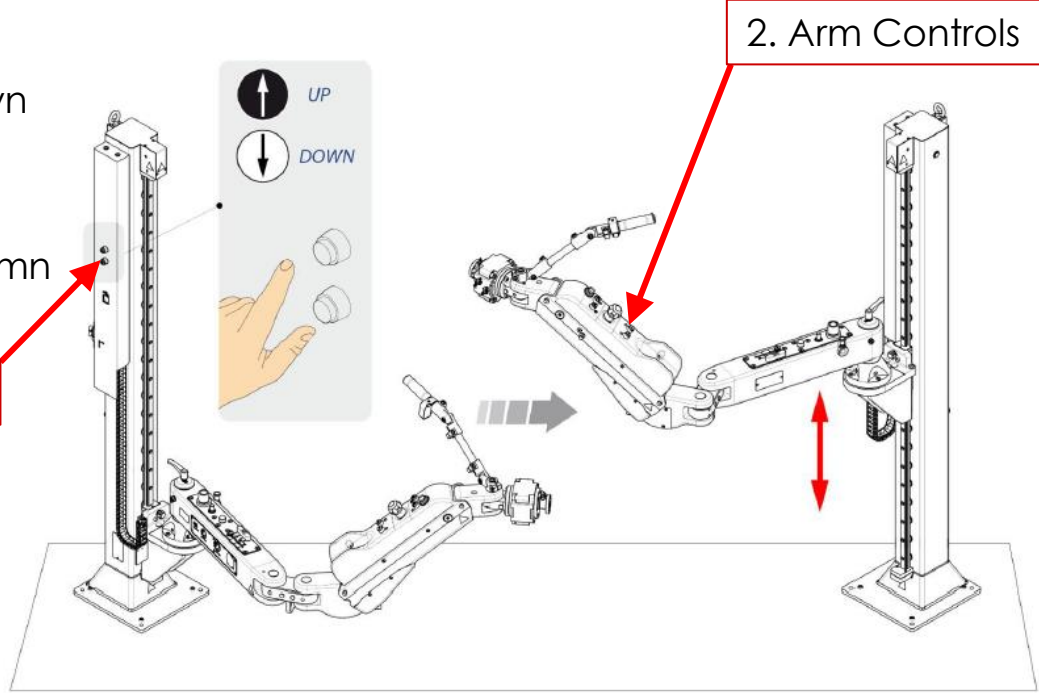


Image – 1. Column Controls




Image – 2. Arm Controls



It is possible to regulate the ascending and descending speed to adapt to the working conditions. Refer to the 3arm Manual for details.

Note: HMS Pre-set travel speed prior to dispatch

Step 6 – Arm, Headmember | Tool Change

 Before any headmember / tool change. Ensure that the Headmember(s) are secured in their supports and clamped.

STEP 1

Engage locking pin locking button



STEP 2

Remove Locking Pin




STEP 3

Remove Arm from headmember



 The reverse procedure is applied when locating and attaching the arm to the next tool

 The 3arm Headmember can be rotated 360°, in 90° increments

Step 7 – 3arm System Pack up & Stowage

- Ensure that the tools are secured in their supports and clamped.
- Ensure that the arm is attached to a tool and that the second tool is set in the correct position to facilitate tool change when required. *Note that the securing and locking devices are correctly applied and the correct tools are in place.*
- Close the main air supply valve and disconnect the air. Check all gauges read zero pressure.
- Move the 3arm Tool Balancer System to your stowage location and ensure the castor wheel brakes are engaged.



If a mast cover has been supplied with your unit, please ensure that it has been closed either via the zipper or the Velcro to prevent dust and moisture ingress.

Air Supply Pneumatic Assembly - Tool and Arm Layout

Separate Air Supply feed
for the pneumatic Column
and arm

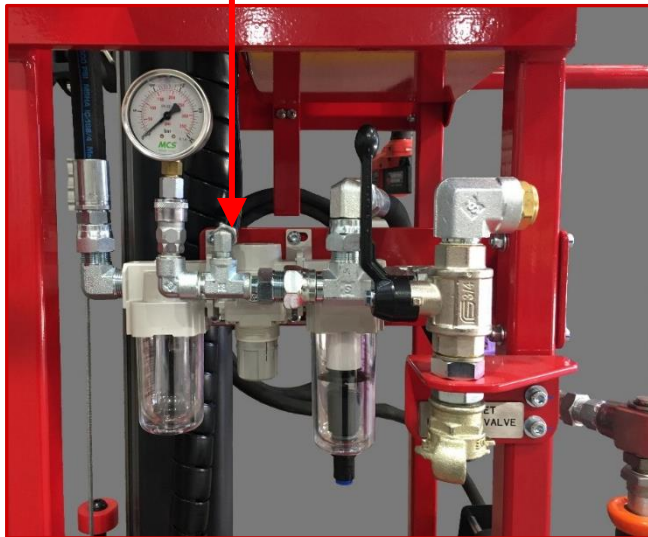


Image – Air Supply Assembly

Air Supply
Rattle Tool

Air Supply
Torque Tool

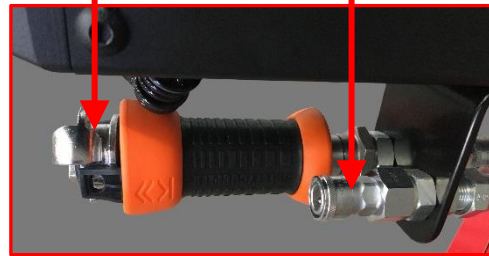


Image - Hose connections for air
tools working on the arm

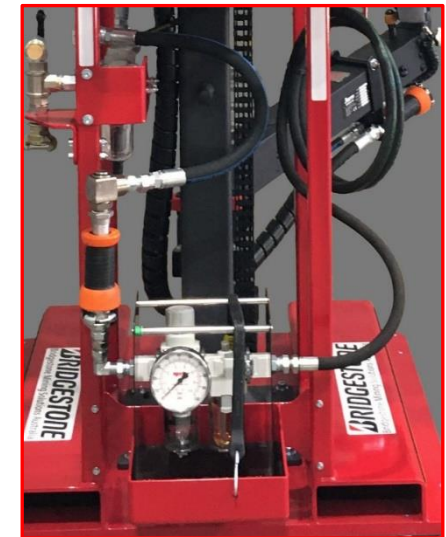


Image – Optional: Separate
Regulator Assembly for the torque
tool air supply

Air Supply Pneumatic Assembly - Tool and Arm Layout

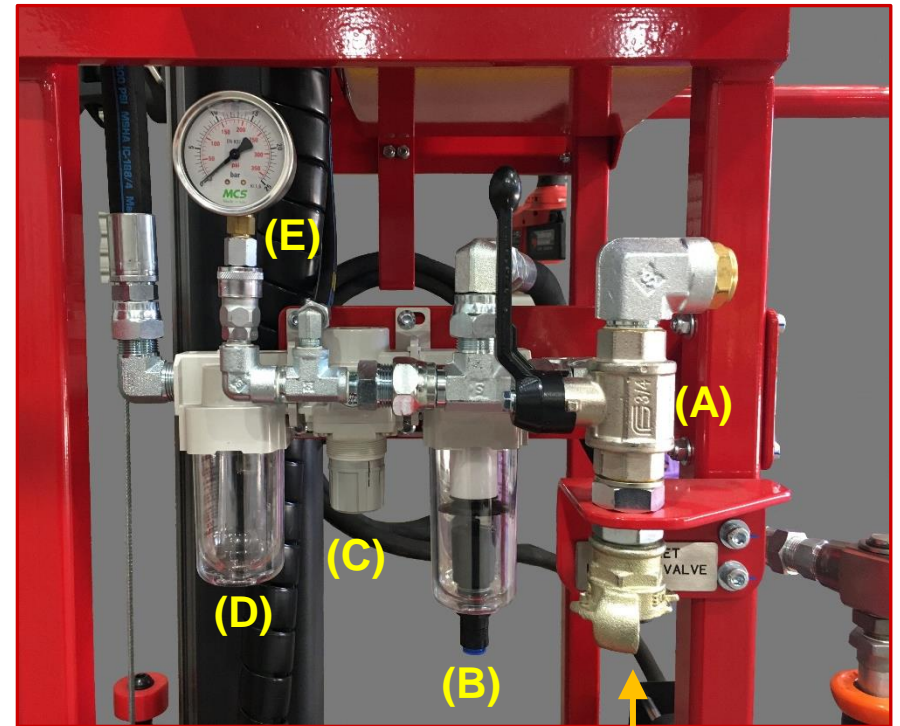


Note: Mains air supply should not contain oil or water, as this will cause damage to the arm control system

- a) Air supply shut-off valve allows the air within the system to be vented when shut off, thus removing any energy in the system, valve is shown in the open position.
- b) Air Filter
- c) Pressure regulator
- d) Lubricator for air tools
- e) Pressure gauge (can be removed for recalibrating)
- f) Air supply indicator on arm



Image – Air supply indicator on the arm



Connect the mains air supply here.

Function Description | Arm, Tilt Brake

Arm - Tilt Brake:

1. Gas springs in the arm are held in check by a pneumatic tilt brake.
2. When the air is ON, and the arm is attached to the tool holder with all safety applied the brake is OFF, and the arm is free to support the tool through the full range of movement.
3. When the air is OFF the brake is ON and the arm tilt is locked.
4. The tool should never be removed from the arm without being secured in the tool support system.
5. If the tool is removed from the arm without being secured, the tilt brake safety circuit will apply the brake before the tool is removed, preventing the arm from moving up and causing damage or serious harm to the operator.
6. For safe tool change to occur the arm must be lowered to the lowest position on the column.

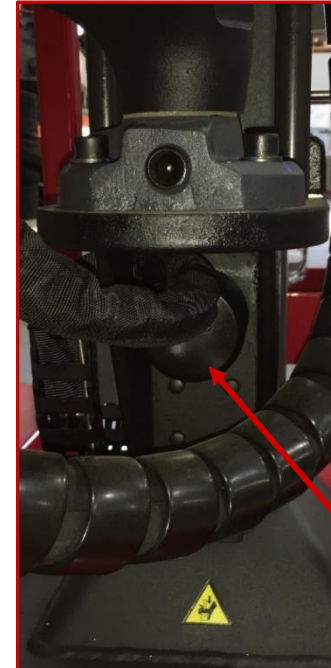


The system should never be removed from the store and placed into service without the arm being secured to one tool in the tool support and the other tool being secure in the second tool support bracket.

Function Description | Column

Column - Elevator:

1. The arm is raised and lowered pneumatically by pressing either the UP or Down buttons and can be controller from the arm or the column.
2. Two wire ropes are used for the raising and lowering with built-in redundancy. Note: Visual inspection of these wire ropes is required before use.
3. There is a lock fitted to the arm carriage which runs up and down the linear rail of the column, This lock is applied when the up or down buttons are not in use and is there to support the arm at the working height, it also will prevent the arm from dropping suddenly when and if the wire ropes are damaged or broken. See (Mast carriage Lock)



The mast carriage lock is situated below the carriage and its purpose is to prevent the arm from lowering during a slackrope conditions.