

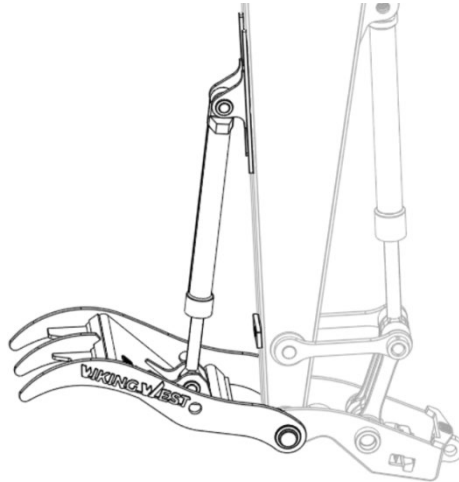


102412-R1

INSTALLATION MANUAL

# HYDRAULIC DIRECT LINK THUMB 10-400 SERIES

## INSTALLATION MANUAL





# COPYRIGHT

---

Copyright © 2022 Viking West Engineered Products

All rights not expressly granted herein are reserved.

You have been provided this document to use with the permission of Viking West Engineered Products (Viking West). You may only use this document in conjunction with your actual or potential use of Viking West products and services, and, except as specifically permitted by Viking West, no part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the express written consent of Viking West. When copying, distributing, publishing, modifying, or making reference to or incorporating this document, no changes in or deletion of author attribution or copyright notice may be made. This document shall be kept confidential as between you and Viking West and by using this document you agree not to disclose this document or the information it contains to any person unless such person is your agent and has also agreed to keep it confidential.

This document is also distributed in Adobe Systems Incorporated's secure PDF (Portable Document Format). You may reproduce the document from the secure PDF file for internal use. Copies produced from the secure PDF file must be reproduced in whole.

## Disclaimer

The names or trademarks or registered trademarks used in this document are the sole property of the respective owners and are governed/protected by the relevant trademark and copyright laws.



This document has been provided to you by Viking West as a guide only. It is not all-inclusive and should not be considered as a replacement for professional services, nor as a definitive text for operating a grappling machine. The accuracy and completeness of this document is not guaranteed, and while Viking West believes the information in this document to be accurate at the time of publishing (including, without limitation, all instructions and diagrams), in furnishing this document to you, Viking West expressly disclaims any and all liability or warranties with respect to the contents of or omissions from this document, including all warranties of merchantability or fitness for a particular purpose.

The information provided by Viking West in this document assumes that personnel have the training, skills, experience, and equipment needed to carry out all operations and maintenance activities described herein in a manner that is consistent with the highest levels applicable to the industry, and that all safety precautions are always taken and all necessary safety equipment used—whether or not safety warnings are provided herein. The operation or maintenance of Viking West grappling machines shall be carried out by personnel with the necessary training, skills, experience, tools, and safety equipment.

Viking West shall not be held liable for direct or consequential damages (such as injuries or damages to property), or incidental expenses resulting from inadequate or dangerous operations or maintenance practices. Trained and experienced personnel are available to assist in operation, maintenance, and troubleshooting. Contact Viking West Engineered Products if assistance is required.

In no event will Viking West be liable to any other party for lost profits, loss of use, loss of data, or any incidental, consequential, direct, indirect, or special damages whether under contract, tort, warranty, or otherwise, arising in any way out of this



document, whether or not such party had advance notice of the possibility of such damages.

Viking West constantly strives to improve its products and services. Accordingly, the information in this document is subject to change at any time without notice and Viking West undertakes no obligation to provide you with access to any additional information or to update or correct any such information.



# TABLE OF CONTENTS

INTRODUCTION.....	7
ABOUT THIS INSTALLATION MANUAL.....	7
WHO SHOULD USE THIS MANUAL? .....	7
SPECIFICATIONS.....	8
SAFETY.....	9
ABOUT THIS SECTION .....	9
<i>General Safety Information</i> .....	9
<i>Direct Link Thumb Safety</i> .....	10
<i>Hydraulic Safety</i> .....	11
INSTALLATION.....	12
ABOUT THIS SECTION .....	12
TOOL AND SUPPLY LIST.....	12
TORQUE CHART .....	13
BEFORE INSTALLATION .....	13
DIRECT LINK THUMB INSTALLATION.....	15
<i>Attaching the thumb assembly to the coupler and excavator arm</i> .....	15
<i>Positioning the backing plate on the excavator arm</i> .....	17
<i>Attaching the hydraulic cylinder to the thumb assembly</i> .....	20
<i>Positioning the cylinder tail mount on the excavator arm</i> .....	21
<i>Welding the cylinder tail mount and backing plate to the excavator arm</i> .....	24



*Reattaching the hydraulic cylinder and connecting the hoses*.....28

**TESTING**..... 29

    TESTING DIRECT LINK THUMB INSTALLATION.....29

*Testing the connection of the hoses*.....29

*Testing the positioning of the cylinder*.....29

*Testing the movement and fit of the Direct Link Thumb*.30

**APPENDIX A: PACKING LIST**..... 32



# INTRODUCTION

---

## ABOUT THIS INSTALLATION MANUAL

This is the installation manual for all models of the Viking West Hydraulic Direct Link Thumb for Quick Change Couplers.

This manual provides general installation recommendations, as well as schematics to aid with the installation and testing.

Read through this manual carefully to ensure that you have a safe and trouble-free installation of your Hydraulic Direct Link Thumb.

All information, illustrations, and specifications in this Installation Manual are based on the latest product information available. Viking West Engineered Products reserves the right to make changes at any time.

## WHO SHOULD USE THIS MANUAL?

The installation must be carried out only by qualified technicians. Ensure adequate safety precautions are in place before installation. The technicians tasked with installation of the Hydraulic Direct Link Thumb should be familiar with this complete documentation package and should have it available for reference.



## SPECIFICATIONS

Basic specifications for each series are shown below. For more detailed measurements and parts lists, please see the **Operator Manual** for each series.

<b>HYDRAULIC DIRECT LINK THUMB 10-400 SERIES SPECIFICATIONS</b>			
<b>SERIES</b>	<b>OPERATING PRESSURE (MPA)</b>	<b>CYLINDER PORTS</b>	<b>ARM PIVOT PIN DIAMETER (MM)</b>
10	17	SAE ORB-4	30
20	17	SAE ORB-4	35
30	17	SAE ORB-4	40
50/60	17	SAE ORB-4	45
80	24	SAE ORB-8	50
120	24	SAE ORB-12	65
150	17.5	SAE ORB-12	80
200	24	SAE ORB-12	80
250	24	SAE ORB-12	90
300	24	SAE ORB-12	100
400	24	SAE ORB-12	110





# SAFETY

---

## ABOUT THIS SECTION

This section provides you with safety information on the Hydraulic Direct Link Thumb, specifically:

- General Safety Information
- Direct Link Thumb Safety
- Hydraulic Safety

### General Safety Information

- Ensure that you and anyone else who are going to operate, maintain, or work around equipment be familiar with the operating and maintenance procedures, and the related safety information contained in this Operator Manual. Don't risk injury or death by ignoring good safety practices.
- Good safety practices not only protect you, but also the people around you. Make these practices a working part of your safety program.
- Do not proceed with the installation, operation, or maintenance of this product before reading and understanding your excavating machine owner's manual and the product manual.
- Incorrect operation, lubrication, maintenance, or repair of this product can be dangerous and can lead to serious injury or death.
- Ensure that all ground personnel remain out of the excavator's operating envelope.
- Follow safe practices when servicing this product:
  - Secure all suspended parts
  - De-energize all hydraulic and electrical circuits
  - Ensure all excavator controls are locked out and that no personnel are in the cab



- Do not modify or weld on any area of this product without consulting Viking West, unless explicitly instructed to do so in this manual. Failure to consult Viking West will void any warranty. Unauthorized structural alteration may put the excavator operator and surrounding workers in danger.
- Viking West cannot anticipate every circumstance that might involve hazards. The warnings in this product manual should not be considered a comprehensive safety program. It is the responsibility of the owners and operators of industrial equipment to develop safety programs specific to their application and maintain current levels of compliance to local Safety Codes.
- Please contact Viking West if you require additional safety information about your product

## Direct Link Thumb Safety

- This Direct Link Thumb is not a certified overhead lifting device. Do not lift with the thumb.
- Always follow local rules and regulations for safe operating practices. Failure to do so can result in property damage, severe injury, or death.
- Ensure that the Direct Link Thumb installation checklist is completed before the excavator is put into service. Refer to the **Direct Link Thumb Installation** section on page 15 for safe installation, adjustment, and break-in procedures.
- The owner of this Direct Link Thumb must develop a regular maintenance and inspection schedule to ensure the safe operation of the equipment.
- Viking West recommends a routine maintenance procedure. Please see the **Operating Manual** for details.
- Periodically check the Direct Link Thumb for signs of damage (for example, broken or worn pins, structural damage, or cut hoses).



- Ensure that ground personnel remain out of the operating envelope of the excavator and drop zone of any loads.
- Never attempt adjustments while the excavator is moving.
- Do not adjust pressure settings without consulting with Viking West. Changing settings such as pressure relieve level could result in hydraulic component failure.

## Hydraulic Safety

- This product is equipped with hydraulic accessories. Be aware of high-pressure fluid hazards and take appropriate precautions.
- Mismatched or incorrect hydraulic connections, fittings, or adapters can result in possible injury, damage, or product malfunction.
- Ensure that all fittings, couplings, and other hydraulic connections are intact and properly tightened before operating the hydraulic system.
- Check the hydraulic hoses regularly for wear and tear. When replacing, do not mix and match hydraulic hoses from different brands, as they are tested and specified to different failure thresholds. When replacing a hose, ensure that the replacement hose is routed in the same manner so that it is not subject to wear, rubbing, kinking, and so forth.
- Always hook up the case drain line when hooking up the other hydraulic hoses.



# INSTALLATION

---

## ABOUT THIS SECTION

This section provides you with information on how to install the Viking West Hydraulic Direct Link Thumb.

## TOOL AND SUPPLY LIST

You will need the following tools:

- Metric and imperial wrench sets
- Torque wrench
- GMAW (MIG) welding machine
- Mallet (to tap out pins as necessary)
- Straps for suspending/securing components

You will also need the following supplies:

- Welding consumables compatible to ASTM A572 Grade 50 base material
- Medium (blue) Loctite or equivalent thread lock
- Hose kit for hydraulic connections



## TORQUE CHART

Use the following torque chart when tightening fasteners.

THREAD SIZE	TORQUE (FT-LB)*
M8	14
M10	28
M12	50
M14	80
M16	100
M20	100

\*If top lock nut is used, snug tight is sufficient for tightening.

## BEFORE INSTALLATION

Before installing the Viking West Hydraulic Direct Link Thumb, complete the following:

1. Check the contents of the package to make sure nothing is damaged or missing. See Appendix A: Packing List on page 32 for the complete packing list.
2. Familiarize yourself with the main components of the Direct Link Thumb, as shown in Figure 1 below.

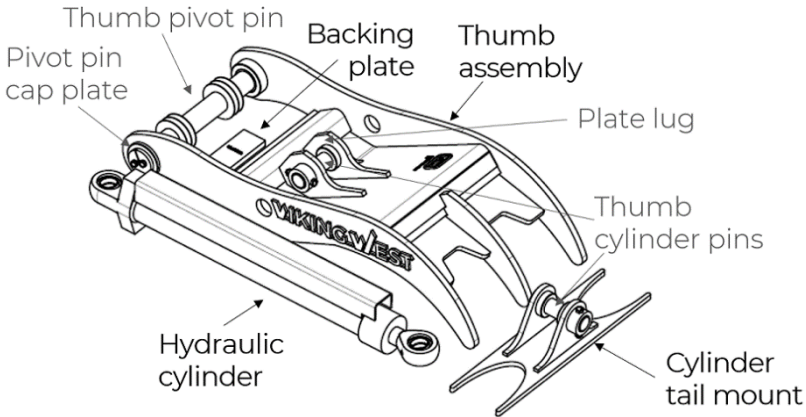


Figure 1: Main components of the Direct Link Thumb. Items labelled in grey are relevant sub-parts.

**Note:** The 10, 20, 30, and 50/60 series do not come with a cylinder tail mount. For these series, a tail mount should be pre-installed on the excavator arm by the manufacturer.

Viking West sells optional tail mounts for these series in case the manufacturer-installed tail mount is missing or damaged.

3. If the excavator arm is not equipped with a quick change coupler, install one following the manufacturer's directions.
4. If there is an attachment currently being held by the coupler, remove the attachment.
5. Ensure that the area around the excavator is clear.



## DIRECT LINK THUMB INSTALLATION

To install the Viking West Hydraulic Direct Link Thumb:

1. Attach the thumb assembly to the coupler and excavator arm.
2. Position the backing plate on the excavator arm.
3. Attach the hydraulic cylinder to the thumb assembly.
4. Position the cylinder tail mount on the excavator arm (where necessary).
5. Weld the cylinder tail mount and backing plate to the excavator arm.
6. Reattach the hydraulic cylinder and connect the hoses.

These steps are described in detail below.

### Attaching the thumb assembly to the coupler and excavator arm

To attach the thumb assembly to the coupler and excavator arm:

***Note:** Start with a quick change coupler attached to the excavator arm, and no attachments on the coupler.*

1. Use the excavator arm to lay the coupler down on a flat surface.
2. Turn off the excavator and lock out the cab.
3. Remove the stick pin that holds the coupler to the excavator arm (see Figure 2 below).

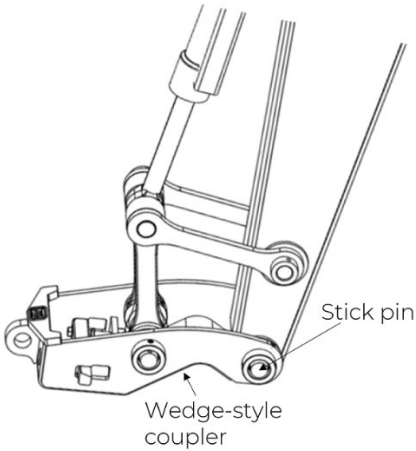


Figure 2: Location of stick pin

4. Remove the pivot pin from the thumb assembly.
5. Line up the pin bores in the coupler, excavator arm, and thumb assembly as shown in Figure 3 below.

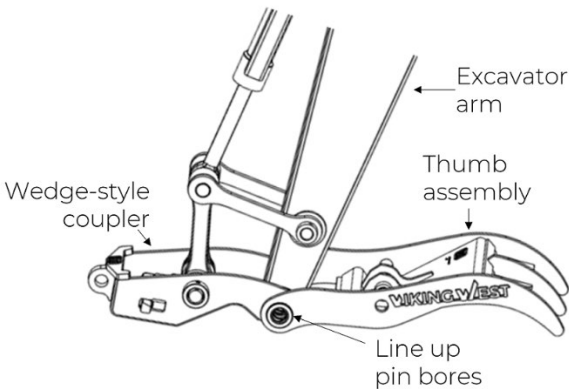


Figure 3: Lining up pin bores on coupler, excavator arm, and thumb assembly





6. Insert the thumb pivot pin through the pin bores in the coupler, excavator arm, and thumb assembly, securely attaching them together.
7. Lock the thumb pivot pin in place using the pivot pin cap plate, as shown in Figure 4 below. Apply medium Loctite to the fastener threads. Apply standard torque according to the torque chart on page 13.

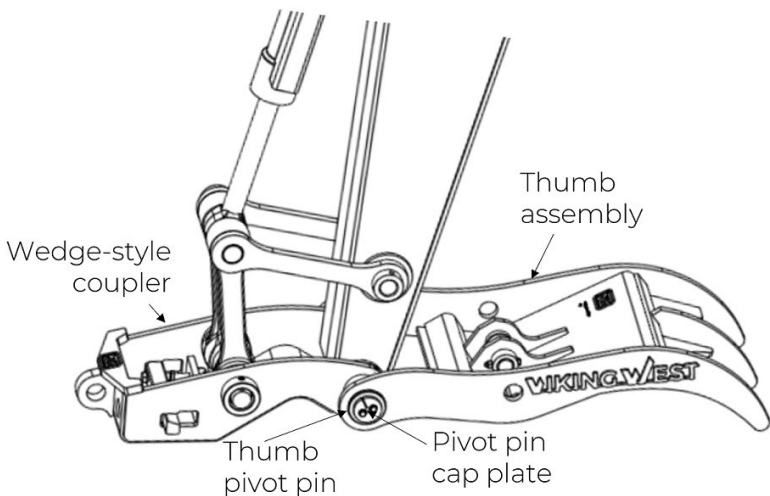


Figure 4: Direct link thumb assembly attached to coupler and excavator arm.

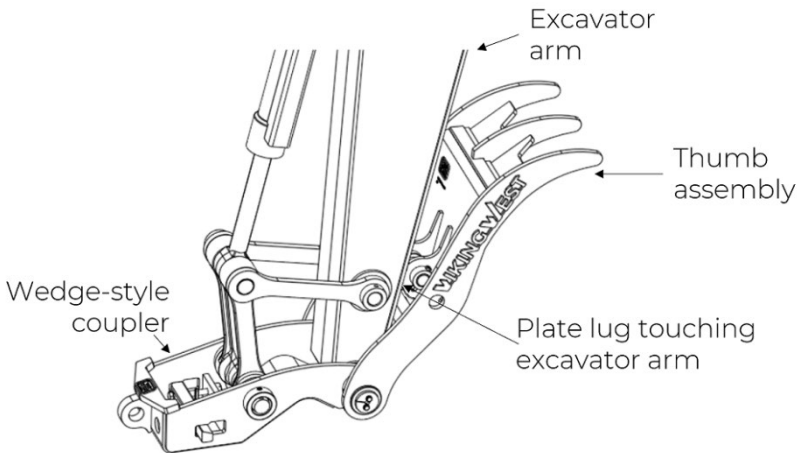
## Positioning the backing plate on the excavator arm

To position the backing plate on the excavator arm:

1. Rotate the thumb assembly so that the plate lug is touching the excavator arm, stopping the thumb from



rotating further, as shown in Figure 5 below. Mark the area where the plate lug touches the excavator arm.



**Figure 5: Thumb assembly rotated so plate lug touches excavator arm.**

2. Rotate the thumb away from the excavator arm and remove the paint in the area you marked, exposing the metal in an area large enough to fit the backing plate (with some extra allowance in all directions).
3. Rotate the thumb back up to the excavator arm and position the backing plate so that the plate lug will hit the



backing plate rather than the excavator arm (as shown in Figure 6 below). Tack weld the backing plate in place.

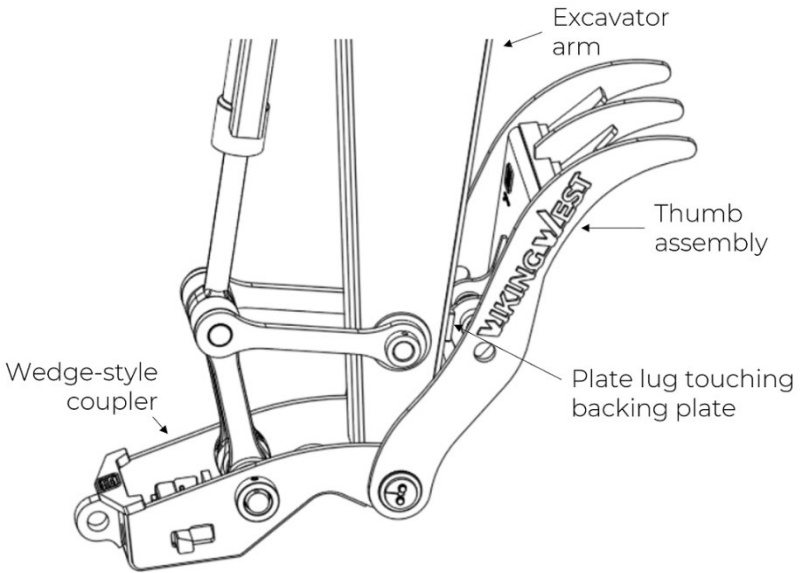


Figure 6: Positioning the backing plate before welding it to the excavator arm.



## Attaching the hydraulic cylinder to the thumb assembly

To attach the hydraulic cylinder to the thumb assembly:

1. Familiarize yourself with the proper orientation of the hydraulic cylinder, as shown in Figure 7 below.

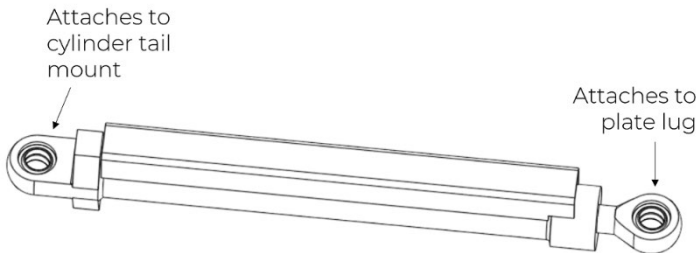


Figure 7: Orientation of the hydraulic cylinder

2. Use the thumb cylinder pins to attach the hydraulic cylinder to the cylinder tail mount and the plate lug. Lock the pins in place using the locking nuts and bolts, as



shown in Figure 8 below. Pay attention to the correct orientation of the tail mount.

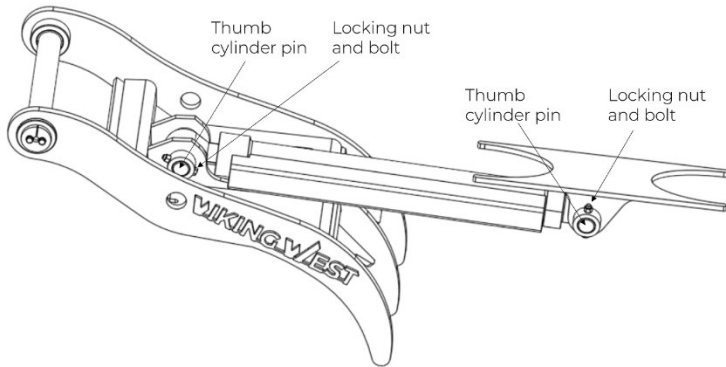


Figure 8: Cylinder attached to plate lug and tail mount.

**Note:** When installing the 10, 20, 30, and 50/60 series, the tail mount will normally already be attached to the excavator. For all other series (or for compact excavators where the tail mount is not already installed), the tail mount should still be free during this step.

## Positioning the cylinder tail mount on the excavator arm

**Note:** This section can be skipped if the excavator already has a pre-installed tail mount in place.

To position the tail mount on the excavator arm:

1. Make sure the cylinder is collapsed completely. It should have arrived in the fully collapsed configuration.



2. Unplug the hydraulic ports and extend the cylinder 3 mm (1/8 ") as shown in Figure 9 below.

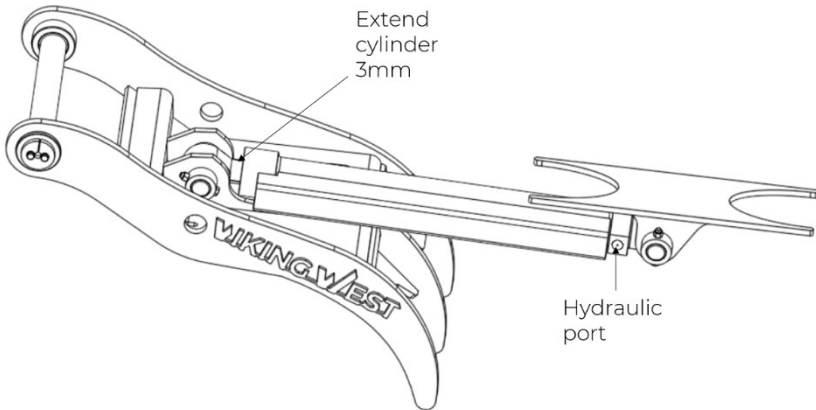
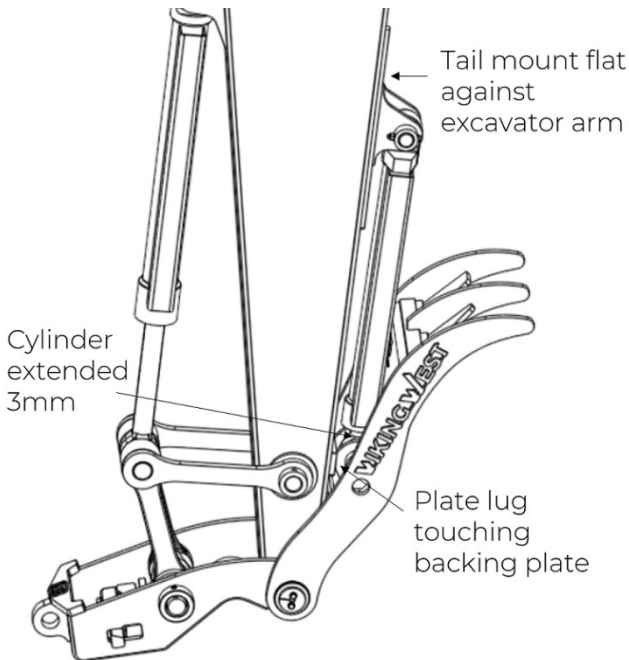


Figure 9: Unplug the hydraulic ports to extend the cylinder slightly.

3. Plug the cylinder ports again so the cylinder position is locked.
4. Swivel the thumb assembly up so that the plate lug is touching the backing plate, and then position the cylinder so that the tail mount is flat against the excavator arm, as



shown in Figure 10 below. Mark the area where the tail mount touches the excavator arm.



**Figure 10: Positioning the tail mount on the excavator arm.**

5. Rotate the thumb and cylinder away from the excavator arm and then remove the paint in the area you marked on the excavator arm, exposing the metal in an area large enough to fit the tail mount, with some extra allowance in all directions.
6. Rotate the thumb back up to the excavator arm so that the backing plate is touching the plate lug. Check that the



cylinder is still extended to 3mm, and then place the tail mount flat against the excavator arm as shown in Figure 11 below and tack weld it in place.

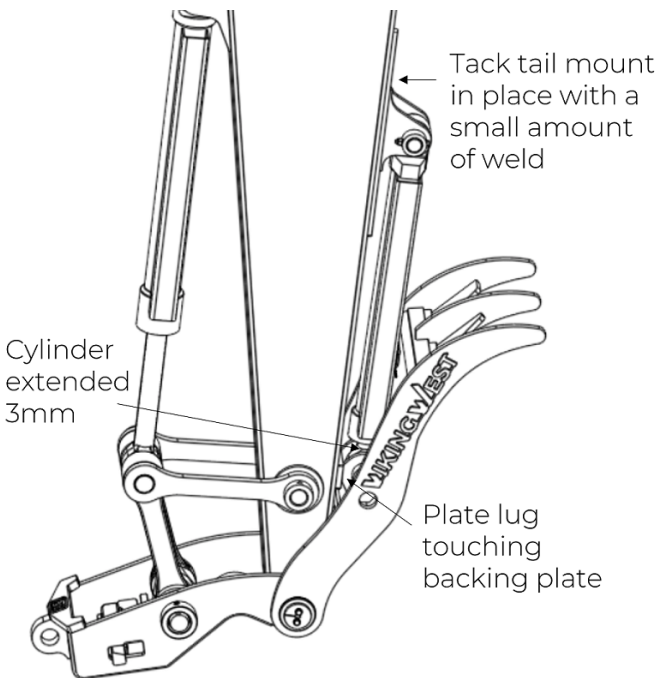


Figure 11: Positioning the tail mount for welding.

## Welding the cylinder tail mount and backing plate to the excavator arm

*Note:* The first part of this section can be skipped if the excavator already has a pre-installed tail mount in place. If





*you only need to weld the backing plate, start at step 3 on page 26.*

To weld the cylinder tail mount and backing plate to the excavator arm:

1. Remove the cylinder thumb pin attaching the cylinder to the tail mount, and then rotate the thumb and cylinder away from the excavator arm. Support the thumb by using a safety strap or other similar device, as shown in Figure 12 below.

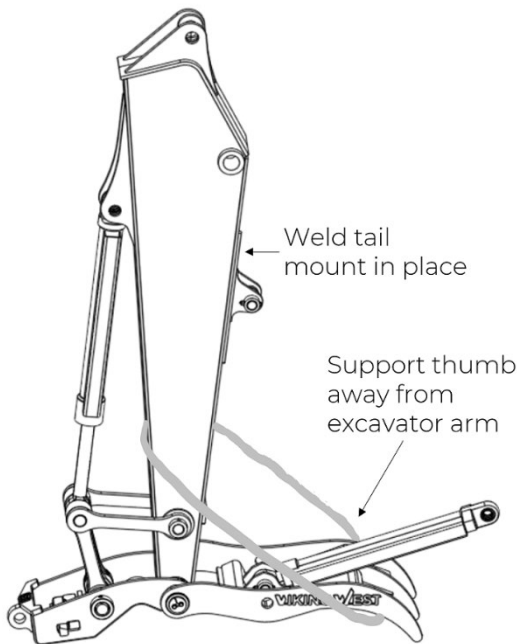


Figure 12: Supporting the thumb during welding.

- Weld the tail mount to the excavator arm following the instructions in Figure 13 below. Use welding consumable that is compatible to ASTM A572 Grade 50 base material.

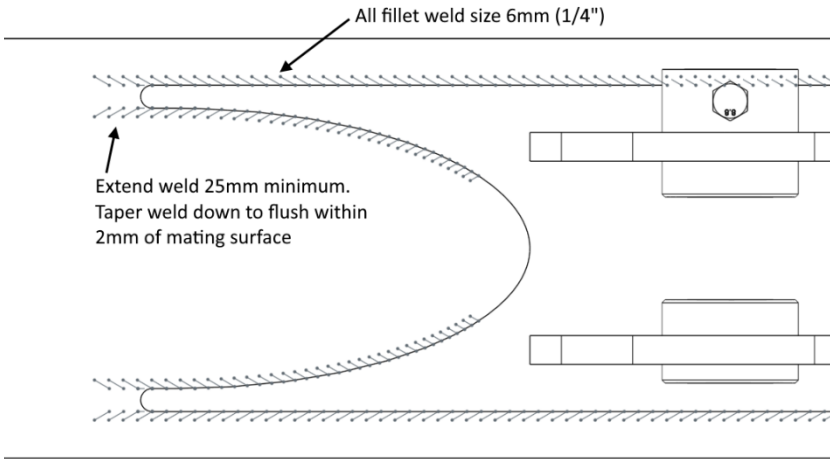


Figure 13: Welding instructions for the cylinder tail mount.

- Weld the backing plate to the excavator arm following the instructions in Figure 14 below. Use welding consumable that is compatible to ASTM A572 Grade 50 base material.

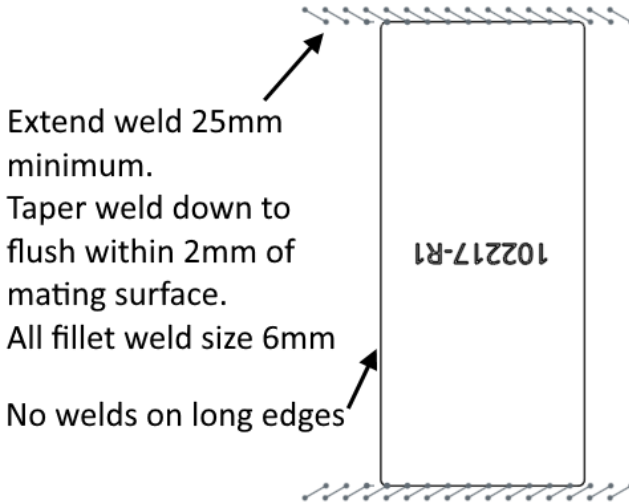


Figure 14: Welding instructions for the backing plate.

4. Repaint the excavator arm around the backing plate and the cylinder tail mount (if applicable).





# TESTING

---

## TESTING DIRECT LINK THUMB INSTALLATION

Test your installation of the Direct Link Thumb by:

1. Testing the connection of the hoses
2. Testing the positioning of the cylinder
3. Testing the movement and fit of the Direct Link Thumb

The rest of this section describes each of the above testing steps in detail.

### Testing the connection of the hoses

To test the connection of the hoses:

1. Use the controls in the cab to extend and retract the cylinder.
2. If the controls are reversed, you can fix the problem by either switching the hoses or switching the control wires for the main valve.

### Testing the positioning of the cylinder

To test the positioning of the cylinder:

1. Collapse the cylinder as far as it will go.
2. Verify that the plate lugging on the thumb assembly is touching the backing plate on the excavator arm



3. If the cylinder is fully collapsed before the plate lugging reaches the backing plate, you will need to move the tail mount. Carefully remove the welds, and then follow the directions in the **Positioning the cylinder tail mount on the excavator arm** section on page 21. Once the tail mount is tacked in place in its new position, weld it again following the directions in the **Welding the cylinder tail mount and backing plate to the excavator arm** section on page 24.



***CAUTION:** Avoid removing base material in the excavator arm plate during tail mount repositioning.*

## Testing the movement and fit of the Direct Link Thumb

1. Use the cylinder to articulate the thumb through the full range of its motion, as shown in Figure 16 below. It should



be able to move easily through the cylinder's full range of motion without any obstructions.

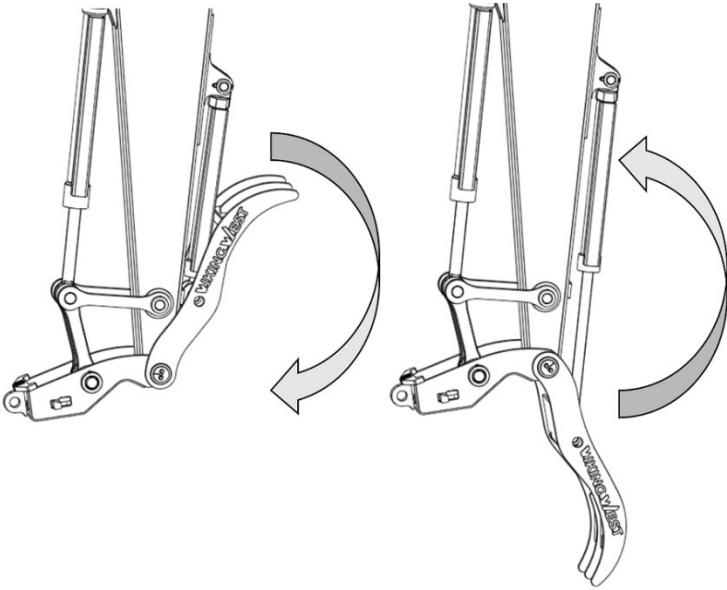


Figure 16: Articulating the Direct Link Thumb.

For any additional questions and concerns, contact Viking West Engineered Products: [support@viking-west.com](mailto:support@viking-west.com)



## APPENDIX A: PACKING LIST

---

For the complete parts list, see the Operator Manual for specific thumb models.

ITEM NUMBER	DESCRIPTION	QUANTITY
1	Direct Link Thumb Assembly	1
2	Thumb Cylinder	1
3	Backing Plate	1
4	Cylinder Tail Mount	1