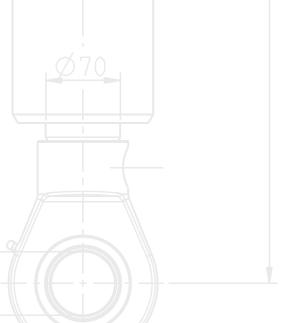


# FOR EXTREME LIFTING PROS ISSENTING P





Original instructions
Version history
Version 1.1 21/02/2018

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#### 1. Foreword

Dear Lifting Professional,

Thank you for choosing the NUMMI cylinder!

You have chosen a product in which more than 60 years of experience, today's requirements and modern production technology are combined.

As a result you get a safe and long lasting tipping cylinder of premium quality.

In this Users' Manual you find the most important information you need for successful use of your NUMMI cylinder.

Read the manual before taking the cylinder into use.

This manual gives you instructions for a safe operation and service of NUMMI tipping cylinders and the tipping system.

The manufacturer reserves the right to make changes to their products and to the text of this book.

Yours truly,

**NUMMI Sales** 

Wipro Infrastructure Engineering Oy Torpanmäentie 3, 25500 PERNIÖ, FINLAND

Tel. +358 (0) 29 055 2849

Fax. +358 (0) 29 055 2800





#### 2. Before use

These instructions apply to vehicle superstructures that are intended for normal highway use.

 If the NUMMI tipping cylinder is used in other conditions, the assembler must make sure that the structures and components are applicable for the given field of operation.

#### NOTICE!

 Make sure that the manufacturer or importer has intended the chassis to be used with a tipping cylinder. If not, the retailer and the customer must agree on the responsibility for the assembly.

Read these instructions and the official regulations before you start the installation:

- SFS 5339, Road vehicles, Tipping and cassette systems, constructional safety.
- SFS-EN 982, Safety of machinery. Safety requirements for fluid power systems and their components.
- SFS-EN 1050, Safety of machinery. Principles for risk assessment.
- The European Parliament and Council Directive 2006/42/EY (Machinery Directive).

Always obey the local laws and regulations.

The following instructions are of general nature. When you do the assembly, obey the model-specific instructions of the vehicle manufacturer.

#### 2.1. Identification of the cylinder and the manual

The manual provides information of the cylinder models:

SUT, TT, RT, ETV, JTC, JTD, DFC, DFE, EFC, and EFE.

You can identify the cylinder model from the product label (type plate) on the product.



# 2.2. EC declaration of conformity

Each instruction manual must contain the EC declaration of conformity, or a document setting out the contents of the EC declaration of conformity, showing the particulars of the machinery.

# 2.3. Intended use of the products

#### 2.3.1. Intended use

A tipping cylinder is used to lift the body.

#### 2.3.2. Non-intended use

Everything except the ones listed in "Intended use".





# 3. Safety messages

The safety messages shown on this page are used to identify safety messages in these instructions:



**DANGER** 

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



**WARNING** 

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

**NOTICE!** 

NOTICE indicates a situation which, if not avoided, could result in material damage.



This general hazard symbol identifies important safety messages in this manual. Carefully read, understand and obey the messages.



# 3.1. General warnings and notices

#### **NOTICE!**

- Do not use the tipping cylinder until you have read and understood this manual.
- Note that the main purpose of a tipping cylinder is to lift the body and not to work as a stabilizer.

# $\Lambda$

#### **DANGER**

- Do not go below the lifted body without a service prop.
- Never go below the body when the body is loaded.
- Before the tipping. make sure that there is free space and nobody is in the danger zone.
- Make sure no powerlines are nearby.



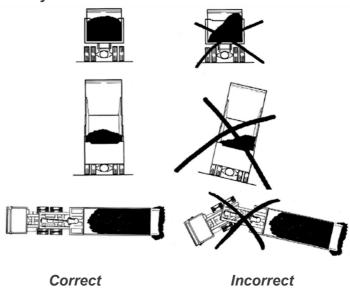
#### **WARNING**

- Use a knock-off kit with the underbody cylinders.
- Inspect the tipping truck or trailer before each use that everything is in order.



- Do not tip on a side slope or up hill. Tip on level ground.
- Do not tip in high winds.
- Do not shake the body to make the load come off.
- Make sure that the load is evenly loaded in the body.







Do not wash the cylinder with solvents, high pressure or steam washer.





- Do not take overload. The cylinder can lift more than its maximum thrust/load, but never take overload. The cylinder lifts also the body. The maximum load of the cylinder is the body and the load.
- Do not use the tipping cylinder without a correct relief valve.



# 3.2. Safety labels on the products

Keep the safety labels clean and visible at all times. Examine the condition of the safety labels daily. The safety labels that have faded, been damaged, been painted over, come loose or that do not meet the legibility requirements for safe viewing distance must be replaced before operating the product.

Do not wash the cylinder with solvents, high pressure or steam washer.



Do not use a pressure washer to clean a tipping cylinder.

This safety label is located on the subframe near by the cylinder.

Do not go below the lifted body without service prop and never go below the body when the body is loaded.



This safety label is located on the subframe near by the cylinder.





NUMMI logo is located on the subframe near by the cylinder.



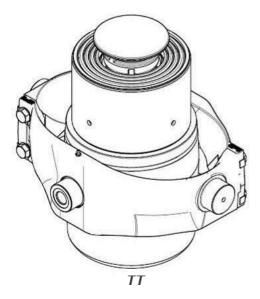
Product label is located on the subframe near by the cylinder or on the cylinder.

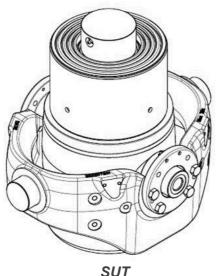




# 4. Technical information of tipping cylinders

## 4.1. NUMMI single-ram underbody cylinders TT and SUT





NUMMI single ram TT and SUT underbody cylinders are used for three-way and rear-end tipping.

The differences between the SUT underbody cylinder and TT underbody cylinders are:

- the cradle
- the installation
- · the knock-off system.

The TT and SUT underbody cylinders can be used for three-way tipping, as the cylinder has a rotating joint in the chassis and the body.

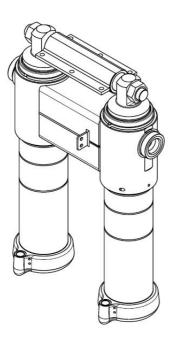
The TT and SUT underbody cylinders are non-stabilizing tipping cylinders.

The maximum working pressure for the TT and the SUT is 250 bar.

The maximum load for the TT and the SUT if from 14 tons to 32 tons. The maximum load varies on the model.



# 4.2. NUMMI twin-ram cylinder RT



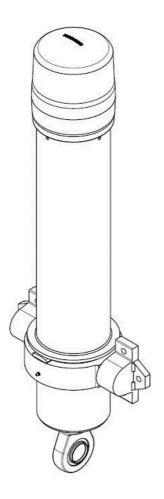
NUMMI twin ram cylinder is an underbody cylinder which has two cylinders attached together with a casing and an axle.

NUMMI twin ram cylinder is used for rear tipping only.

The maximum working pressure for the RT is 250 bar and the maximum load is from 32 tons to 50 tons depending on the type.



# 4.3. NUMMI front end cylinder ETV



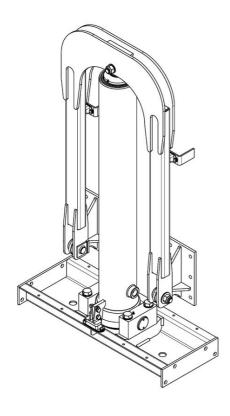
NUMMI ETV front end cylinder is designed to lift loads with no side forces that have an effect on the tipping cylinder.

The cylinder is installed upside down and is mainly used for vehicles that are installed with a tipping tank container or a rigid superstructure vehicle/trailer.

The maximum working pressure for the ETV is 170 bar and the maximum load is 32 tons.



# 4.4. NUMMI front end cylinders JTC and JTD



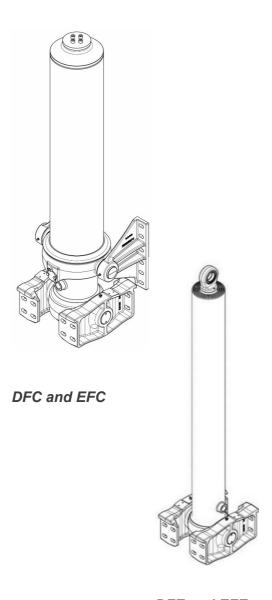
NUMMI JTC/JTD cylinders are stabilizing front end cylinders for tippers and trailers. The JTC/JTD cylinder has a lifting arm to let the body to move from side to side. This decreases side forces to the tipping cylinder.

The difference between the JTC and the JTD is that they have different lower attaching parts.

The maximum working pressure for the JTC and the JTD is 170 bar and the maximum load is from 32 tons to 40 tons.



# 4.5. NUMMI tipping cylinders DFC, DFE, EFC and EFE



DFE and EFE

NUMMI tipping cylinders DFC, DFE, EFC and EFE are stabilizing front end cylinders for tippers and trailers.

The difference between the DFC and EFC and the DFE and EFE is that the DFC and EFC cylinders have a cover tube which prevents damage to the cylinder from water and dirt. The DFE,EFE cylinders have an eye on the upper end of the cylinder.

The maximum working pressure for the DFC, DFE, EFC and EFE cylinders is between 130 - 225 bar and the maximum tipping is between 25 - 50 tons.



# 4.6. NUMMI special cylinders

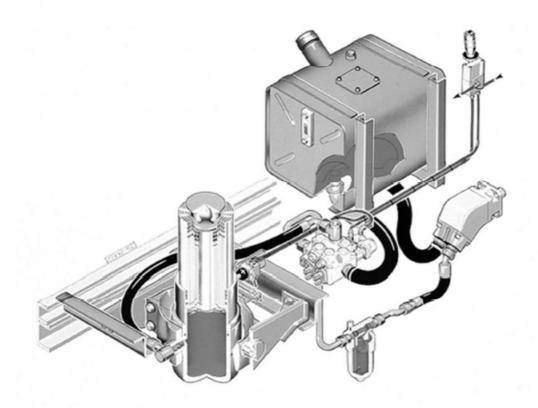


NUMMI has special cylinders such as sideway cylinders and tail gate cylinders.



# 5. The tipping system

Your NUMMI tipping cylinder works best if you use NUMMI tipping and hydraulic components. These components are designed and tested to work together with the cylinder.



More information about the components from the manufacturer of the device or from the builder of the body.



#### 5.1. Pump

The size of the pump depends on the ratio of the PTO, the stroke volume of the tipping cylinder and the needed pressure.

**NOTICE!** The maximum tube speed is 0.5 m/s.

## 5.2. Main tipping valve

There are different tipping valves depending on how many sections are necessary. One single acting section is necessary for you to operate the tipping cylinder.



#### **WARNING**

Make sure that the maximum working pressure given on the product label is not exceeded!

To make sure that no pressure peaks occur in the hydraulic system, the valve must have a main relief valve. Each section must have port relief valves depending on the device.

The NUMMI tipping cylinder must have a port relief valve of 130 to 250 bar, depending on the model.

Make sure what the working pressure is from the product label.



Do not use the cylinder without a correct pressure relief valve. If an incorrect pressure relief valve is used, it can cause death or injury.





#### 5.3. Knock-off kit

The function of a knock-off kit and a valve is to stop the body movement before the cylinder is fully extended. The knock-off kit gives protection to the stop rings at the end of extension.

#### **NOTICE!**

Always use the correct knock-off kit designed for the related NUMMI tipping cylinder.

There are different types of knock-off limiters. The pneumatic and the hydraulic knock-off valves are most frequently used.

Make sure that the knock-off valve stops the cylinder movement before the cylinder is in full length. The knock-off valve is to stop the cylinder movement first, and in case of a delay or a failure, the safety straps or wires tighten before the cylinder is in full length. Note that the safety strap has a stretch.

#### 5.4. Filters

Always use a return filter and/or pressure filter in the tipping system.

Change the filters according to the maintenance intervals or when the filter is blocked.

#### **NOTICE!**

Use a filter in the tipping system. If you do not use a filter, it can cause damage to the tipping cylinder.

#### 5.5. Oil tank

The filling capacity of the oil tank must be 20% larger than the displacement volume of the tipping cylinder.

Make sure that the oil tank is installed correctly.



#### 5.6. Cabin control

You can use a lever, an electrical switch or a radio controller to control the tipping cylinder.

Make sure that the tipping controls have a dead man's switch function. With the function, the lever or the switch goes to a neutral position when it is released.

When you use an electrical or radio control, use a separate constant flow regulator. You can lower the speed the same way as you do with the pneumatic lever.





# 6. To operate the tipping system



- Do not go below the lifted body without a service prop.
- Never go below the body when the body is loaded.

#### 6.1. Before you tip

Before you use the tipping cylinder, examine:

- the oil level
- the hoses
- the fittings
- the cylinder mountings.

To tip safely, note the instructions below:



Inspect the tipping truck or trailer before each use that everything is in order.

- The stabilizing tipping cylinder models give better lateral support during the tipping but the main purpose is to lift the body.
- The non-stabilizing cylinder models do not give lateral support.



- The stability for the tipping comes from:
  - the rigidity of the body
  - rear hinge
  - sub frame chassis frame
  - suspension
  - tires.
- You must keep the components in good condition and the tire pressure must be correct.



- Do not tip on a side slope or up hill. Tip on level ground.
- Do not tip in high winds.
- Always tip on a firm and a level ground that is sufficiently resistant to the weight of the vehicle and the load.
- Note that there is more load on the rear axle(s) as the body is lifted.
- Unsatisfactory ground conditions, loads that have not moved freely or have been frozen, and high cross-winds have caused tippers to fall over.
- Examine the power take-off instructions from the operating manual of the vehicles or from the builder of the body.





#### 6.2. To lift the body



- Before the tipping. make sure that there is free space and nobody is in the danger zone.
- Make sure that there are no power lines nearby.
- 1. Make sure that the handbrake is on.
- 2. Have the gear lever in the neutral position.
- 3. Stay in the cabin or out of the danger zone during the tipping.
- 4. Start the clutch dependent power take-off (PTO) or the pump.
- 5. Open the tailgate or the side gate.
- 6. Move/push the cabin control to the lift position
- 7. Keep the control in the lift position and lift the body smoothly up.
- 8. When the body is at the full extension, set the cabin control back to a neutral position.



# 6.3. To lower the body



- Before the tipping, make sure that there is free space and nobody is in the danger zone.
- Make sure that there are no power lines nearby.
- 1. Make sure that the body is empty.
- 2. Move/push the cabin control to the down position.
- 3. Make sure that the body is fully down, and set the cabin control back to a neutral position.
- 4. Close the tailgate or the side gate.
- 5. Stop the PTO/pump.
- 6. Make sure that the PTO and the cabin control are disengaged before you drive off.





#### 7. Maintenance instructions

As in all hydraulic systems, the parts of a tipping cylinder are precision-made. To get the maximum trouble-free service life, service the tipping cylinder regularly and keep the tipping cylinder clean.

The service intervals given are applicable when the tipping cylinder is used in usual conditions. In very dirty conditions, the intervals must be shortened.



**WARNING** 

Do not wash the cylinder with solvents, high pressure or steam washer.

The warranty is not applicable if the maintenance is not sufficient.



**DANGER** 

- Do not go below the lifted body without a service prop.
- Never go below the body when the body is loaded.

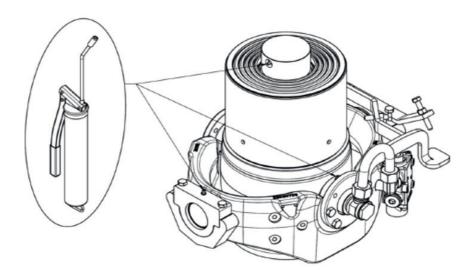
#### 7.1. To apply grease to greasing points

Keep the greasing points always lubricated.

- Use good quality grease that includes Molybden.
- You can find the important greasing points for different tipping cylinder models in the pictures that follow.
- Make sure that you also apply grease to:
  - the tipping axle/axles
  - · the service prop
  - the tailgate
  - the tailgate cylinders
  - the pump shaft.



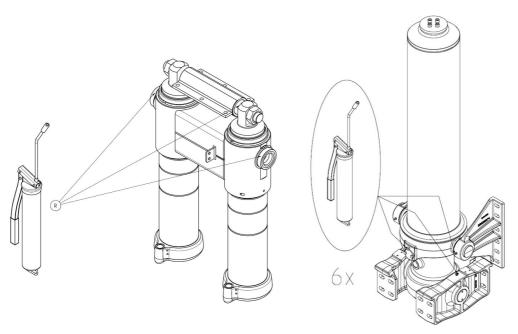
- DFE and EFE upper spherical eye is service free.
- If the grease does not go into the nipple, it is clogged or the joint has rusted. Replace the nipple with a new one, or repair the joint immediately to prevent problems.



TT and SUT greasing points

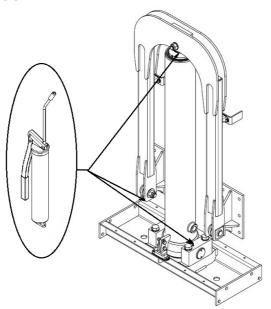






RT greasing points

DFC, EFC, DFE, EFE greasing points



JTC / JTD greasing points



# 7.2. To replace filters

The filters have a replaceable filter element. You must change the filter element after the first six months of operation.

After that, you must change the filter element each year, at same time when you change the oil.

#### 7.2.1. The location of the filters

- The pressure filter is between the pump and the tipping valve.
- The return filter is found on top of the oil tank.
- The breather filter is in the oil filler cap of the tank.

#### 7.2.2. To change the filter element

- 1. Remove the filter case.
- 2. Discard the expired element.
- 3. Clean the case carefully.
- 4. Change the O-ring if there is one.

# 7.3. The hydraulic oil to use

We recommend that you use hydraulic oils that meet these standards in ISO VG 22 viscosity class:

- Oil type DIN 51524 HVLP
- ISO 11158 HV





#### 7.4. Maintenance intervals



- Do not go below the lifted body without a service prop.
- Never go below the body when the body is loaded.

The maintenance intervals are calculated for a normal road tipping vehicle or a trailer. If the tipping cylinder is used off road, the maintenance must be done more often.

After three weeks of operation make sure that:

- all the connections, bolts, screws and other fixings are tightened correctly.
- the weldings are in good condition.

Speak to the builder of the superstructure for more information if necessary.

After six months of operation change hydraulic oil and all filter elements. Then follow the below maintenance intervals.

#### 7.4.1. Daily

- Examine visually the tipping cylinder and the hydraulic system for leaks and tightness of the connections.
- · Keep the important components clean:
  - the tipping cylinder
  - the valves
  - the pump.



#### **7.4.2.** Weekly

- Apply grease to all the greasing points. The greasing points are shown in the chapter 7.1.
- Make sure that the automatic greasing system functions correctly.
- Measure the oil level and fill again if necessary.

#### **7.4.3.** Monthly

- Examine the condition of the hydraulic hoses and pipes.
- Tighten loose connections.
- Replace hoses if necessary.
- Examine and tighten the knock-off kit mountings and test that the knock-off works correctly. See more information in chapter 5.3.
- Examine and tighten the tipping cylinder fastenings.
- Drain off the water from the oil tank.
- Examine each thread connection in the cylinder.
- Examine the thread between the outer tube and the bottom. Speak to NUMMI service for assistance.
- · Make sure that the cylinder is not leaking.
- Make sure that the tubes do not have scratches.
- Make sure that the weldings are in good condition.

#### 7.4.4. Each 6 Months

Examine and tighten the fastening of:

- the pump
- the oil tank
- the main valve
- the tipping axle
- the safety strap or wires.





#### 7.4.5. Yearly

- Drain off and fill the tank again with clean hydraulic oil (see chapter 7.3.).
- · Change filter elements in:
  - the return filter
  - the pressure filter
  - · the breather filter.

The appendix contains the service schedules to fill in with the service work you have done.



# 8. Troubleshooting

Obey the instructions below if you have these problems with the tipping.

If the problems continue after you have followed these procedures, speak to your nearest NUMMI dealer or service partner, see www.nummi.fi.

# 8.1. The body will not tip

- 1. Make sure that the pump is started. Start the pump.
- See if the maximum tipping weight of the cylinder is exceeded (given in the product label). Decrease the load to the level of the allowed tipping weight.
- 3. Examine the oil level and fill the tank if necessary.
- 4. Examine all hoses and pipes for leakages. Repair all damaged hoses or pipes.
- 5. Make sure that the tipping lever or button is in the "lift" position.
- 6. Make sure that the tipping spool moves when the tipping lever or button is in the "lift" position. Clean the main valve and the tipping spool.
- 7. Measure the pressure from the pump.
- 8. Make sure that the vehicle or the trailer is on a flat ground and the chassis is not twisted.





#### 8.2. The body will not come down

- 1. Make sure that the tipping spool moves. Clean the main valve and the tipping spool.
- 2. Make sure that the service prop or other obstacles are not between the body and the chassis. Remove obstacles safely.
- 3. Examine the cylinder bearings and the tipping axle for possible corrosion. Lubricate the objects if necessary.
- 4. Make sure that the fixing bolts in the front end cylinder are tightened with the correct tension.
- 5. Make sure that the vehicle or the trailer is on a flat ground and the chassis is not twisted.
- 6. Make sure that the oil has the correct viscosity.
- 7. Make sure that the filters are clean.

# 8.3. The body rises slowly or jerky

- 1. Examine the oil level and fill the tank if necessary.
- 2. Examine if there is air in the system:
- Lift the body up several times to the full length.
- The air comes out from the system to the tank.
- 3. Make sure that the breather filter is not clogged.
- 4. Measure the pressure from the pump.



# 8.4. The body comes down without the cabin control operation

- 1. Make sure that there are no leakages. Repair all leakages.
- 2. Examine the tipping spool position to make sure that it is in the correct position.



# 9. Spare parts and service

Use only genuine NUMMI parts from NUMMI dealers or service partners. You can find the nearest dealer or service partner from the web site www.nummi.fi.

Make sure that you know the model and the serial number before you order spare parts or look for more information.

You can find the product code and the serial number in the label attached to the product or from the guarantee certificate.



#### Label on the product

If the label is missing, the serial number of the product is also marked to the cover tube of the cylinder.

- In a twin-ram underbody tipping cylinder and front-end tipping cylinder, the serial number is stamped into the cover tube, 20 cm above the bottom.
- In the single-ram underbody tipping cylinders, the serial number is stamped to the outer tube.

If the manufacturer has repaired an item, it has a serial number that starts with letters "RE". With the correct serial number, it is possible to track the type and production information of the cylinder.

By scanning QR-code from label you will get in product catalog where can be found spare part list for cylinder.



# 10. Warranty

NUMMI delivers a guarantee certificate with every cylinder.

Fill out the certificate and keep together with the cylinder.

The warranty terms, conditions and claim instructions are found at www. nummi.fi.

# 11. Disposal of a product

Products have to be recycled and disposed of based on local laws and instructions.

Nearly all cylinder parts can be recycled when sorted out by material. Seals are hazardous waste.

Oil has to be drained of the cylinder before recycling and disposal. Oil is hazardous waste.

Packing materials are recyclable. Cardboards have to be sorted to cardboard collection, plastics to energy waste or to a separate plastic collection based on the recipient and paper to paper collection. Pallets, frames, interlayers and covers can be re-used.





# Appendix A. Service work schedules

Service After 6 months use Date: Carried out:	Oil change Return filter change Pressure filter change Breather filter change Yearly check / inspection Notice:	
Service Date: Carried out:	Oil change Return filter change Pressure filter change Breather filter change Yearly check / inspection Notice:	
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