

## Adjustment Precautions

- *Be certain to adjust the load brake.*
- *After adjusting the load brake, ask the amputee if the braking feels natural.*
- *After adjusting the pneumatic cylinder, have the amputee walk at various speeds to confirm that the unit is functioning properly.*

## Advanced Pneumatic Knee



# NK-1H

## Heavy-duty NK-1

## Fitting Instruction



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## 9. Extension Stopper Rubber Replacement

To replace the extension stopper rubber, proceed as follows:

(See Figure 10.)

- 1) Bend the knee to remove the old extension stopper rubbers.
- 2) Insert a set of new extension stopper rubbers in their places, having the umbonate surface out, and fix by a double-sided tape attached.
- 3) Bend and extend the knee several times to check for proper installation.

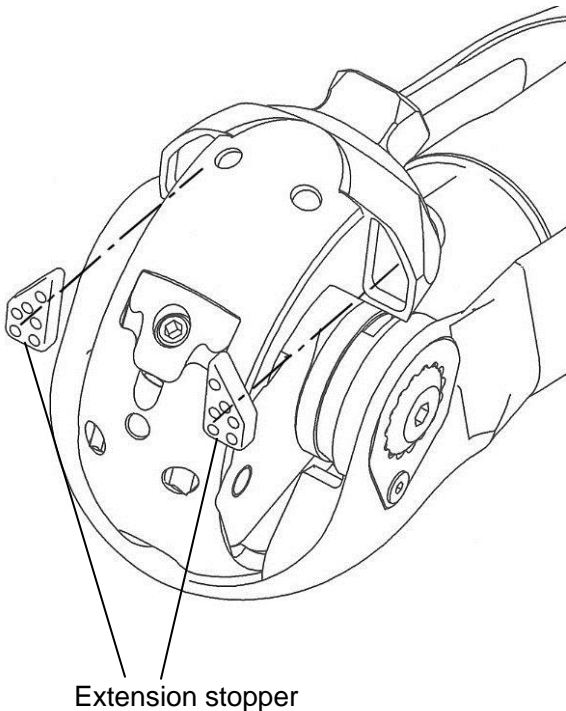


Figure 10. Extension Stopper Rubber Replacement

## 1. Users' Notes

The advanced pneumatic knee is a pneumatic uniaxial knee joint with load brake.



Before using this product, read all precautions included in this Fitting Instruction and the separate User Guide.



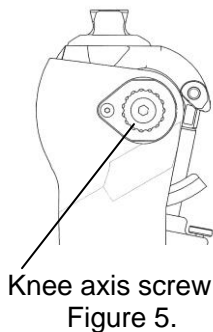
This manual includes the specifications, adjustment procedures, and parts replacement procedures for the product.



After reading, keep this manual for future reference.

## 8. Removing Backlash and Excess Play in the Knee Axis

When there is backlash or excess play in the knee shaft, tighten the knee axis screw shown in Figure 5 as explained in the adjustment procedures (1-4) below:



### Adjustment Procedures:

- 1) As a guideline for positioning the knee axis screw, mark the knee axis screw where it touches the M3 hex set screw. (See Figure 6.)
- 2) Use a 2mm hex wrench to remove the screw bolt and the bolt cover. (See Figure 7.)

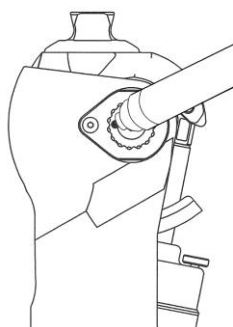


Figure 6.

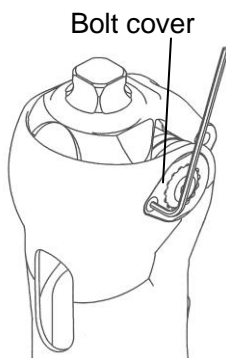


Figure 7.

- 3) Tighten the knee axis screw (toothed screw) with single pitch of the tooth ("tooth by tooth") with a 4 mm hex wrench and then check whether there is any backlash or excess play. If the backlash and play have not been removed, tighten the knee axis screw in the same manner. Use caution as excessive tightening of the knee axis screw makes the flexion resistance too strong when bending and extending the knee. (See Figure 8.)

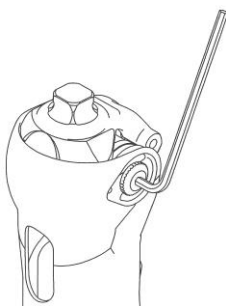
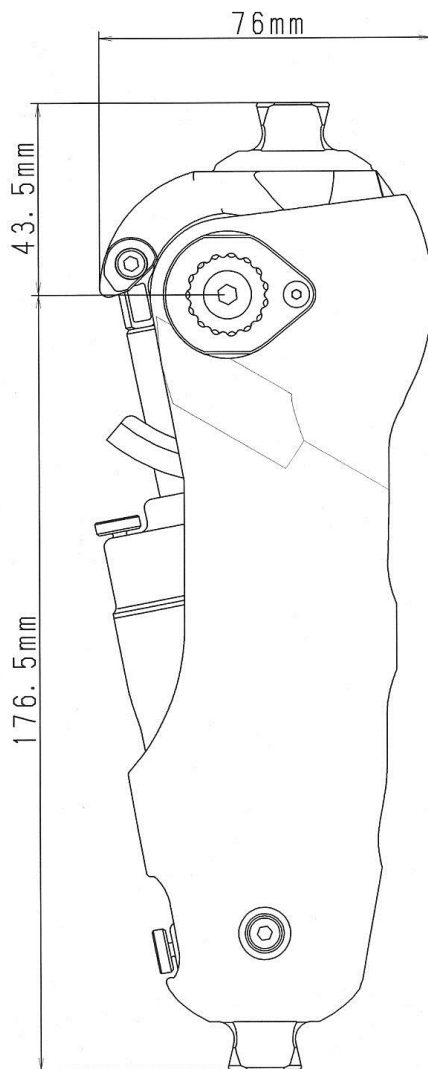
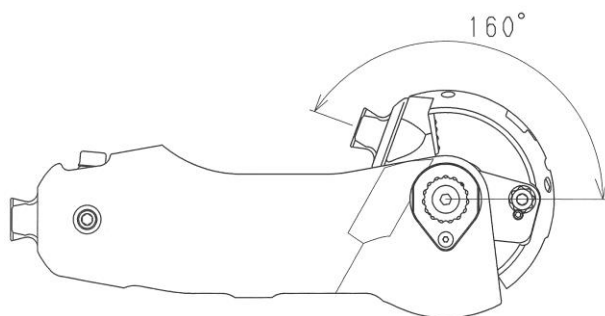


Figure 8.



### Dimensions



### At Maximum Knee Flexion

# 7. Structural Drawing

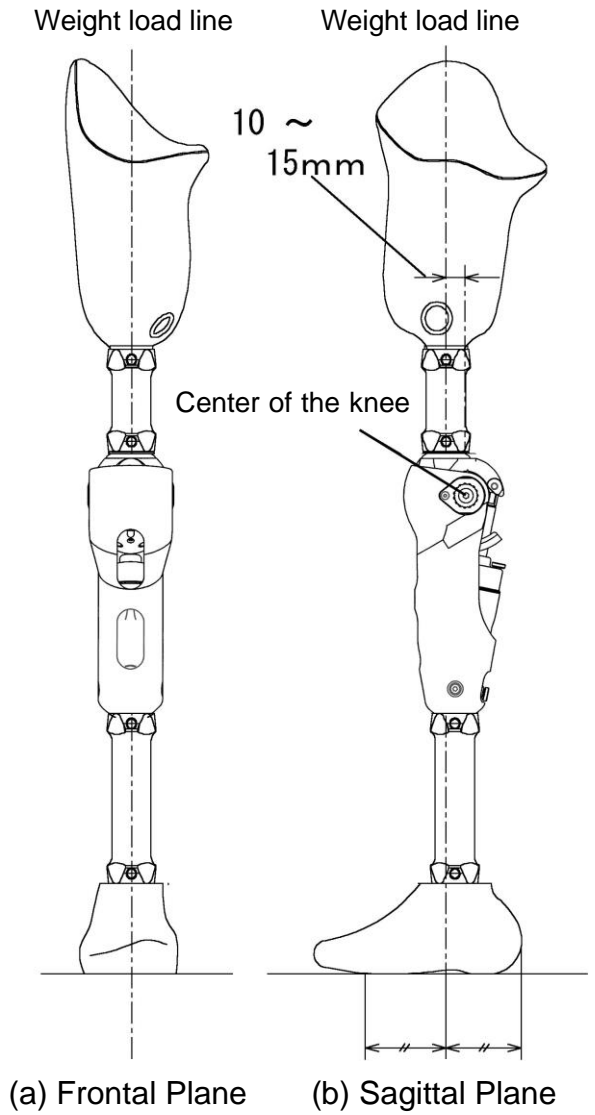
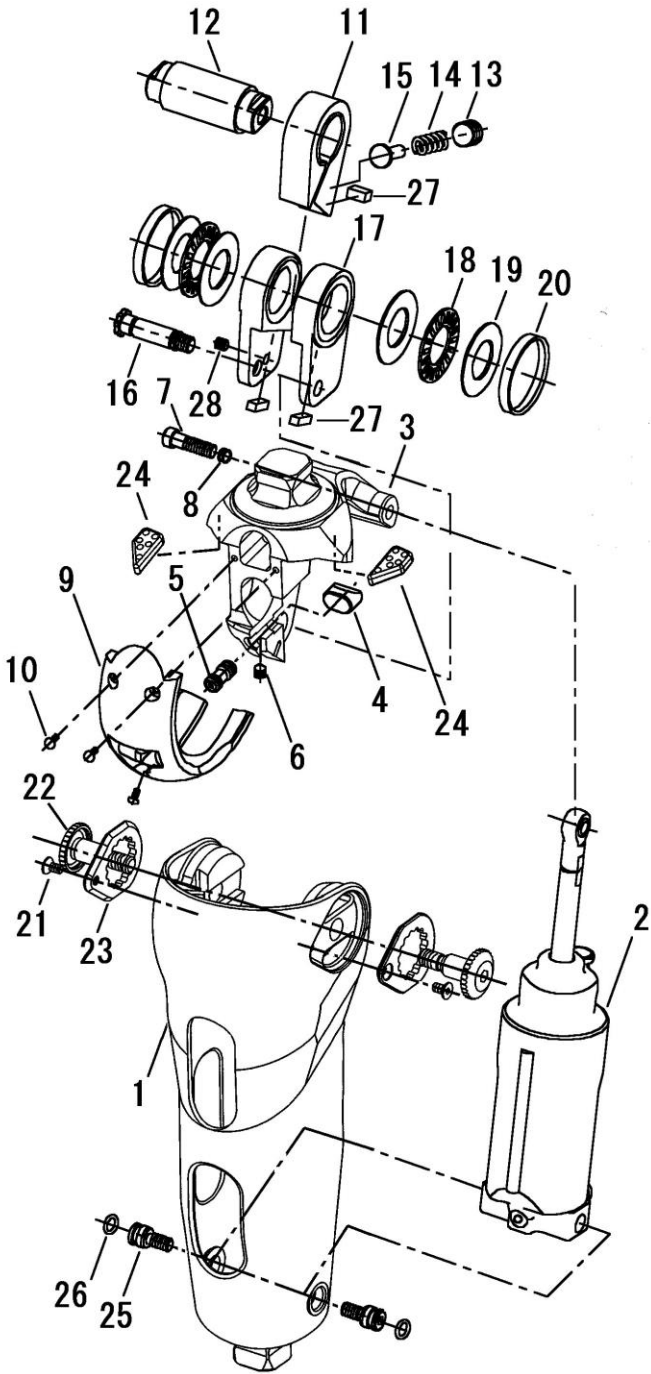


Figure 1. Standard Alignment

# 6. Pneumatic Cylinder Adjustment

Adjust the pneumatic cylinder as follows: (see Figure 4)

Before beginning the adjustment procedure, prepare a test walk area of at least 5 m in length.

## 1) Adjustment of the Swing Speed

### ① Slow Walking Adjustment

The main valve (MV) is used for this adjustment. (using a 2 mm hex wrench)

Adjust the MV by turning it clockwise or counter clockwise until walking slowly feels natural.

(Turning the valve clockwise makes the repulsion force of the cylinder stronger; turning it counterclockwise makes the force weaker.)

Make adjustments in 2 or 3 mark increments using the valve scale as a guideline.

\* The initial setting is "15".

"0" is the maximum repulsion force, "20" is the minimum.

### ② Normal and Fast Walking Adjustment

The assistive valve (AV) and the main valve (MV) are used for this adjustment. (using a 2 mm hex wrench)

If the swing phase is delayed in normal or fast walking, turn the (AV) clockwise. Walking speed range where the swing back speed can be optimized is limited under standard adjustments. For faster walking, turn the MV clockwise in 2 - 3 mark increments. This will cause the overall repulsion force to become stronger. Adjust until the desired results are obtained.

\* The initial setting is "7". "0" is the maximum repulsion force and "20" is the minimum.

**As a guideline, the AV setting ordinarily falls between "3" and "10".**

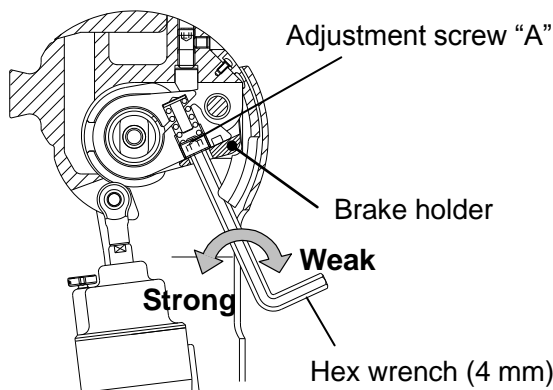
**MV value should be greater than AV value. If not, the knee joint will have trouble with automatic adjusting to changes in walking speed.**

Caution: If the value is set to "0", the flexion resistance of the knee will be increased but there can be a slight feeling of delay during the swing phase as the knee shifts from bending to extending.

## [IMPORTANT!]

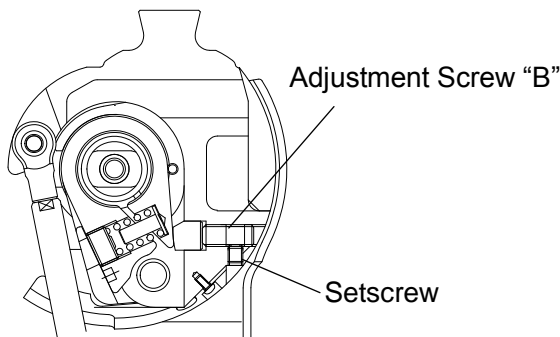
- If the knee locks up due to insufficient shaft clearance, affix a pipe adaptor to the pyramid and pull it while bending the knee to release the lock and enable the knee joint to move freely.

**After adjustment, an adhesive (Loctite #242 or equivalent) must be applied to the setscrew to prevent it from loosening. (Tightening torque: 1.8-1.9 N-m [18-19 kgf-cm])**



**[Caution]**  
Do not turn adjustment screw "A" counterclockwise from a point where it touches the brake holder. This could cause locking or abnormal knee rotation, and would lead to damages to the knee joint.

Figure 2. Load Brake Adjusting Procedures



**[Caution] Setscrew**  
Tightening torque: 1.8-1.9 N-m [18-19 kgf-cm]  
Apply Loctite #242 or equivalent

Figure 3. Load Brake Structure