

5000 PSI

Single Acting

New Hydraulic
Single Acting Work Support

INCH PRODUCTS



Model TNF

INCH PRODUCTS

Hydraulic Work Support Single Action • High Pressure Model

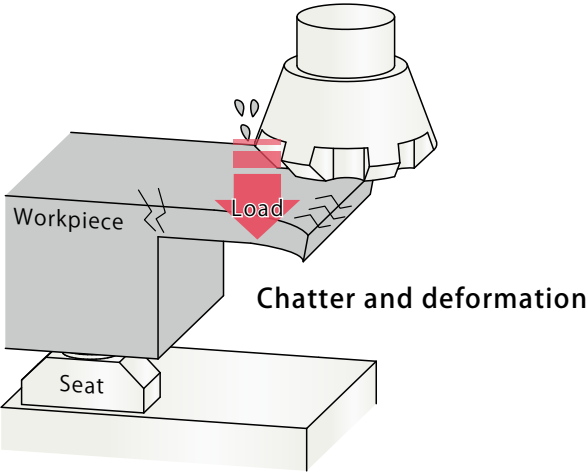
Model TNF



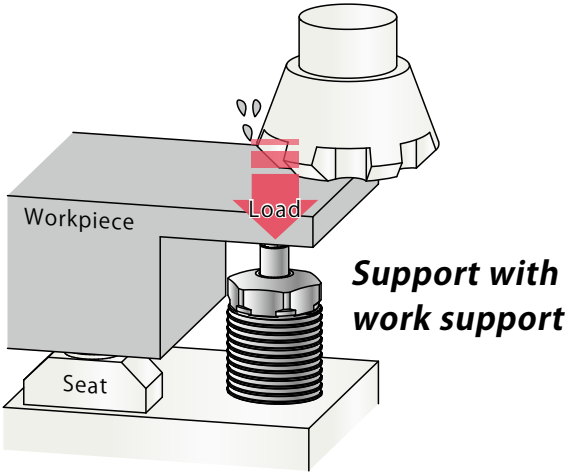
Strong Support from opposite side when load is applied

Inch hydraulic work support

Work support eliminates chattering while machining and prevents deformation by the cutting load.

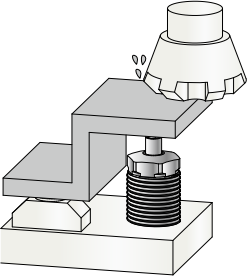


< Without Work Support >

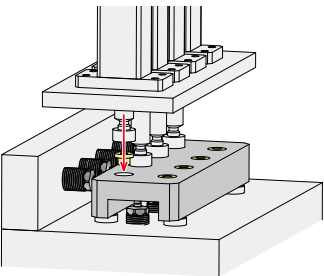


< With Work Support >

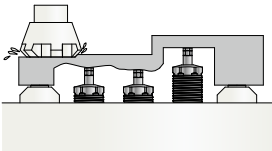
Application Examples



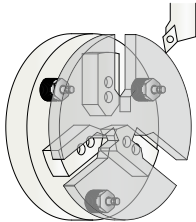
To avoid chattering during machining of thin-walled sections



To support a press-fit machine

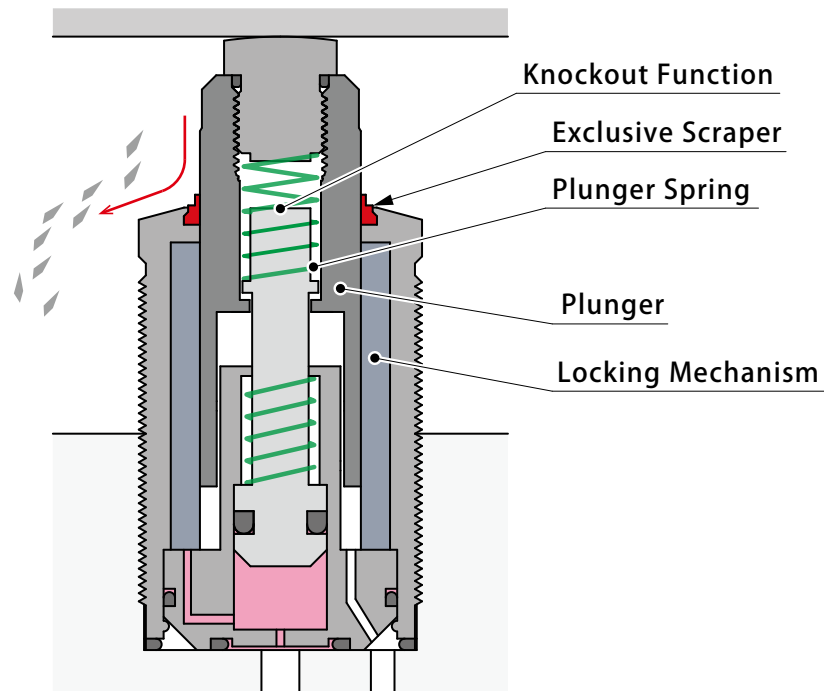


To support a workpiece with different heights



To avoid the radial chatter on lathe machining
※Please contact us.

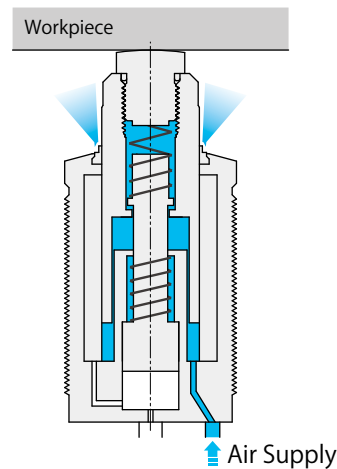
Cross Section * This is a simplified drawing. Actual components are different.



Inch-based Spec and Powerful

This is a high-pressure work support with inch-based specifications. It contributes to the downsizing of equipment.

Air Purging Possible



High Rigidity with Large Diameter Plunger

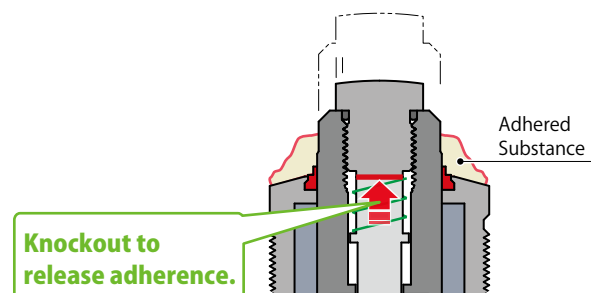
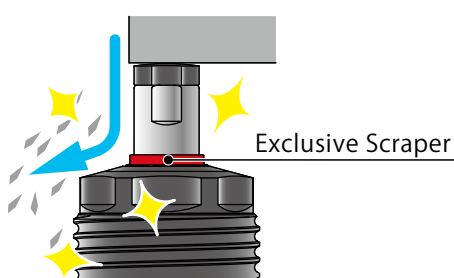
Displacement remains minimal even under heavy cutting and high loads, enabling improved machining accuracy.

Superior Environmental Durability

The work support can be used in various environments with the exclusive scraper to prevent the accumulation of dust such as cutting chips and the knockout function to release adherence after a long-time machine stop.

Knockout Function Utility Model Registration

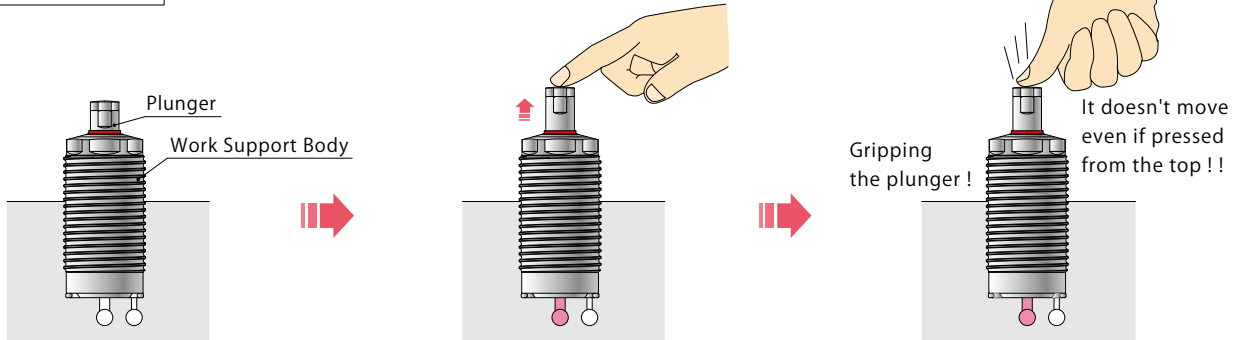
After a prolonged shutdown, if the plunger cannot operate due to adhesion caused by dried sludge, etc., the knockout mechanism releases the adhesion.



● Action Description

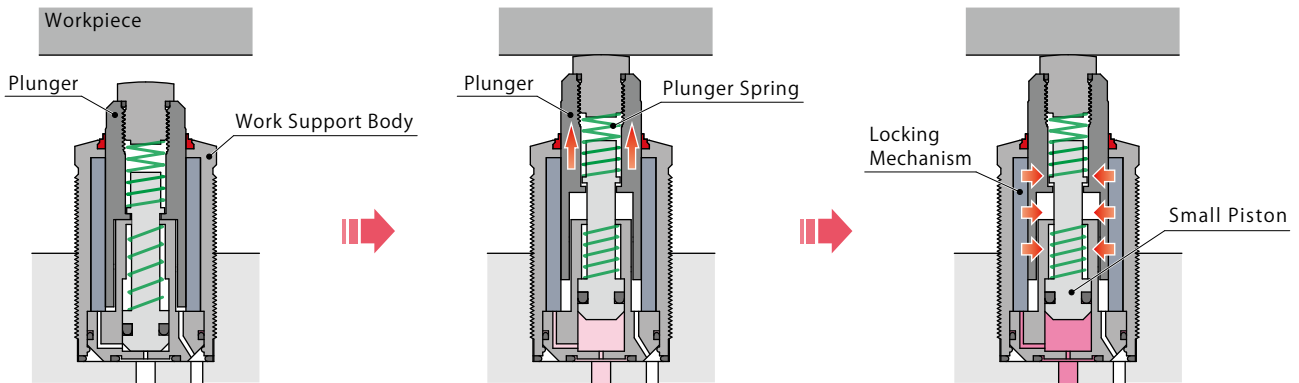
● Hydraulic Advance Model : TNF

Operation



Cross Section

* Simplified drawing. The actual components are different.



Hydraulic Pressure : OFF

The state of plunger down.

**Hydraulic Pressure : ON
(Pressure Rising)**

The plunger lifts up with hydraulic pressure and stops after touching the workpiece.

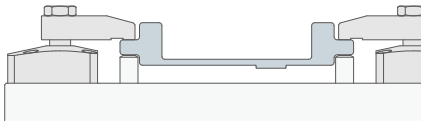
※ The load applied to the workpiece is only the plunger spring force.

**Hydraulic Pressure : ON
(Pressurization Completed)**

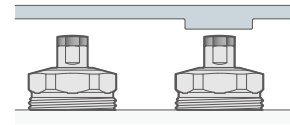
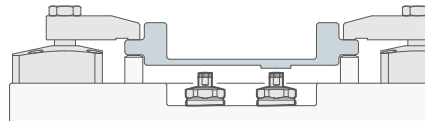
When the small piston is fully stroked, pressure is applied to the locking mechanism, securing the plunger. Once secured, the plunger will not move downward even if pressed from above.

- Plunger is locked where it touches the workpiece within the stroke range.

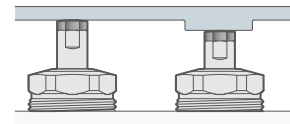
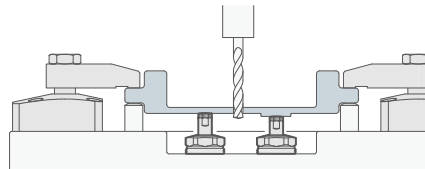
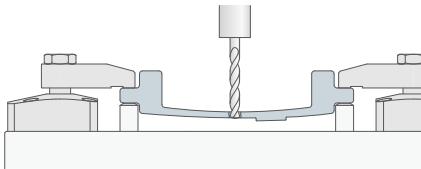
Without Work Support



With Work Support



Before plunger is lifted up

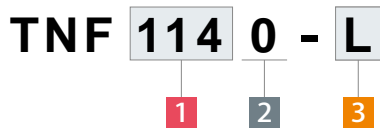


Locked after touching workpiece

Bending

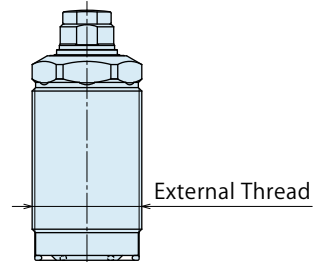
No Bending!!

● Model No. Indication



1 Body Size

- 100** : External Thread 1-16 UN
- 114** : External Thread 1" 1/4-16 UN
- 134** : External Thread 1" 3/4-16 UN



2 Design No.

- 0** : Revision Number

3 Plunger Spring Force

- L** : Low Spring Force
- H** : High Spring Force

● Specifications

| Model No. | | TNF1000-□ | TNF1140-□ | TNF1340-□ |
|---|------------------------------|---|-------------|-------------|
| Support Force at 5000PSI | lbf | 1910 | 3430 | 7970 |
| Support Force (Calculation Formula) ^{※1} | lbf | 0.432×P-251 | 0.751×P-327 | 1.746×P-759 |
| Plunger Stroke | in | 0.26 | 0.31 | 0.47 |
| Effective Stroke | in | 0.24 | 0.30 | 0.45 |
| Cylinder Capacity | in ³ | 0.03 | 0.06 | 0.15 |
| Plunger Spring Force ^{※2} | L : Low Spring Force | 0.9 ~ 1.3 | 1.5 ~ 2.2 | 2.7 ~ 4.2 |
| | H : High Spring Force | 1.2 ~ 1.8 | 2.0 ~ 3.0 | 3.5 ~ 7.5 |
| Max. Operating Pressure | PSI | 5000 | | |
| Min. Operating Pressure | PSI | 1000 | | |
| Operating Temperature | °F | 32 ~ 158 | | |
| Usable Fluid | | General Hydraulic Oil equivalent to ISO-VG-32 | | |
| Weight | lb | 0.31 | 0.64 | 1.83 |

Notes: ※ 1. P in the formula for support force indicates the hydraulic pressure (PSI).
 ※ 2. The plunger spring force indicates the spring design value. It may vary depending on sliding resistance of the plunger and characteristic of the spring, etc. Please read it as a reference value of workpiece contact force.

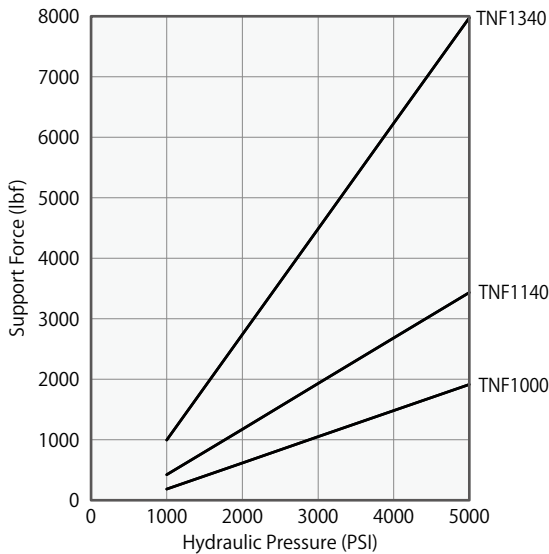
Performance Curve

Applicable Model

TNF 100 0 - L H

1 Body Size

Support Force Graph ※ This graph shows the support force under static load condition.

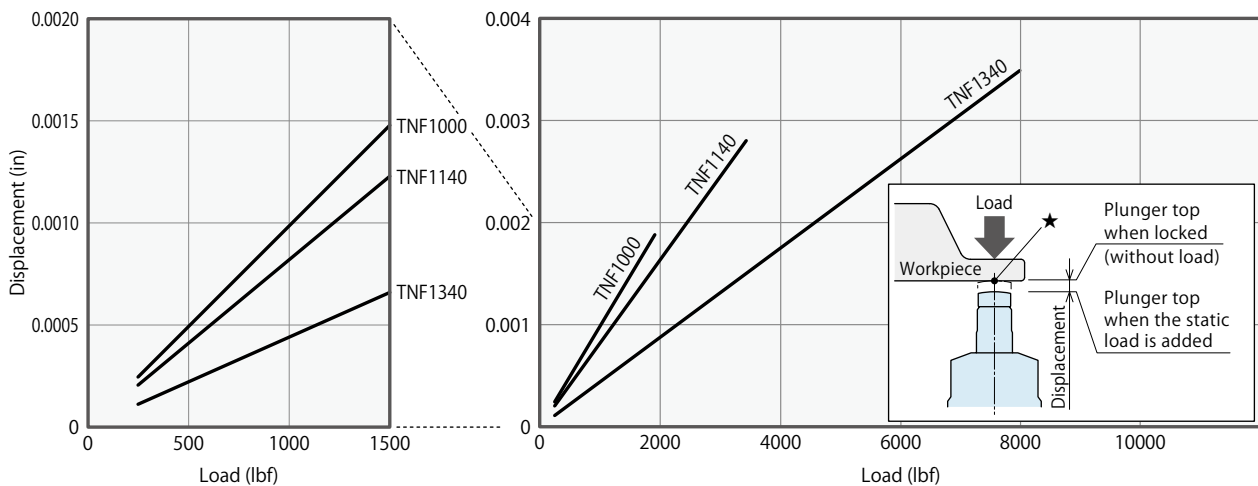


| Model No. | Support Force (lbf) | | |
|---|------------------------|------------------------|------------------------|
| | TNF1000-□ | TNF1140-□ | TNF1340-□ |
| Hyd. Pressure (PSI) | | | |
| 5000 | 1910 | 3430 | 7970 |
| 4000 | 1480 | 2680 | 6220 |
| 3000 | 1050 | 1930 | 4480 |
| 2000 | 610 | 1180 | 2730 |
| 1000 | 180 | 420 | 990 |
| Support Force Formula ^{※1} lbf | $0.432 \times P - 251$ | $0.751 \times P - 327$ | $1.746 \times P - 759$ |

Note : ※1. P: Operating Hydraulic Pressure (PSI)

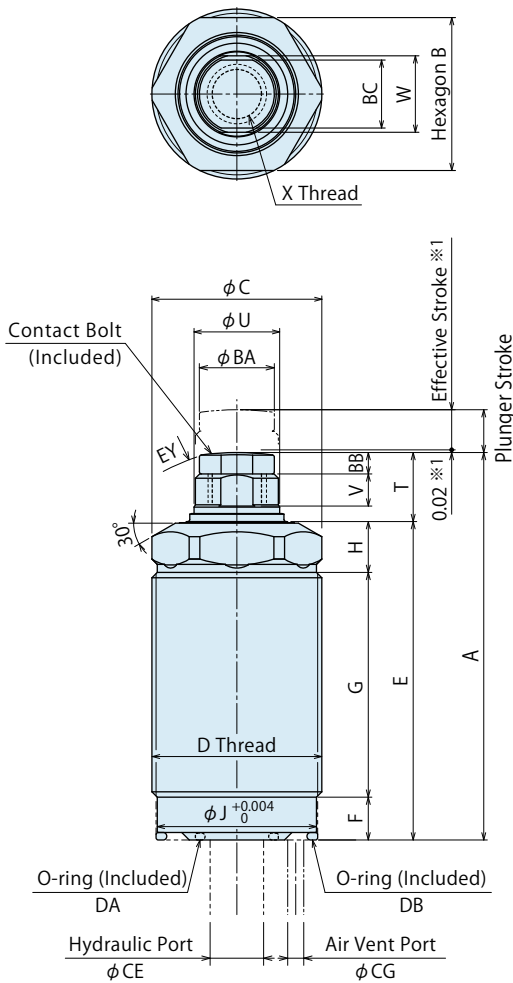
※ This graph shows the static load-displacement of a single work support at supply hydraulic pressure 5000 psi.

Load / Displacement Graph (Not including the displacement of the workpiece side due to unevenness at ★ mark and surrounding clamps.)



External Dimensions

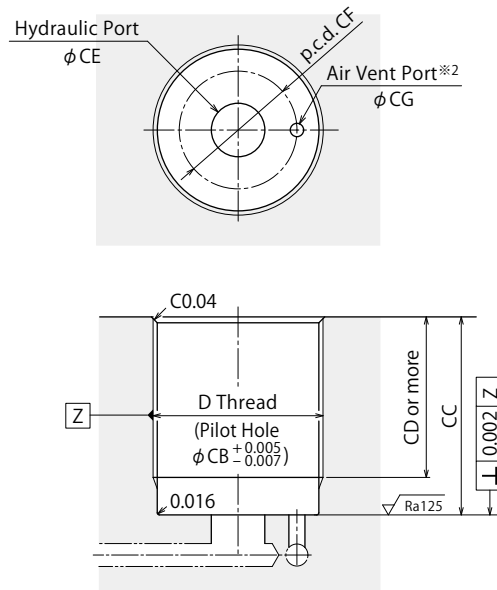
※ This drawing shows the released state of TNF-□ (before the plunger is lifted).



Note :

※1. When the work support touches a workpiece within short stroke range, up to 0.02in from the plunger retract-end, a force which is larger than the plunger spring force will be applied to the workpiece. Please use the work support within the effective stroke range.

Machining Dimensions of Mounting Area

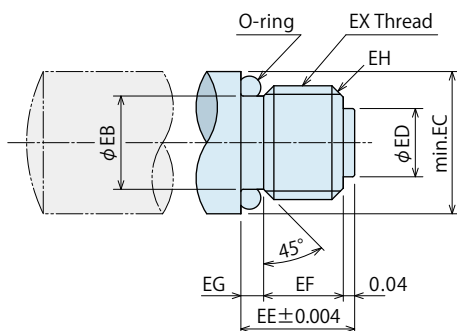


Note :

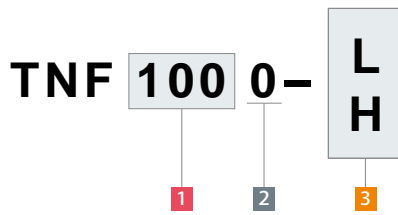
※2. The vent port needs to be machined in an open air environment without the presence of coolant, etc. to avoid any internal contamination. (Refer to P.11 : Appropriate Measures for the Air Vent Port.)

Contact Bolt Design Dimensions

※Reference for designing a contact bolt (attachment) by customer other than the included contact bolt.



Model No. Indication



(Format Example : TNF1000-L)

- 1 Body Size
- 2 Design No.
- 3 Plunger Spring Force

External Dimensions and Machining Dimensions for Mounting ⁽ⁱⁿ⁾

| Model No. | TNF1000-□ | TNF1140-□ | TNF1340-□ |
|---|------------------------|------------------------|-----------------------|
| Plunger Stroke | 0.26 | 0.31 | 0.47 |
| Effective Stroke | 0.24 | 0.30 | 0.45 |
| A | 2.36 | 2.85 | 4 |
| B | 0.88 | 1.13 | 1.56 |
| C | 1 | 1.25 | 1.75 |
| D | 1-16 UN | 1" 1/4-16 UN | 1" 3/4-16 UN |
| E | 1.85 | 2.34 | 3.26 |
| F | 0.24 | 0.31 | 0.35 |
| G | 1.28 | 1.65 | 2.47 |
| H | 0.33 | 0.37 | 0.43 |
| J | 0.92 | 1.17 | 1.67 |
| T | 0.51 | 0.51 | 0.74 |
| U | 0.47 | 0.63 | 0.98 |
| V | 0.24 | 0.24 | 0.33 |
| W | 0.41 | 0.56 | 0.81 |
| X | 5/16-18 UNC Depth 0.43 | 7/16-14 UNC Depth 0.43 | 1/2-13 UNC Depth 0.51 |
| BA | 0.45 | 0.55 | 0.67 |
| BB | 0.16 | 0.16 | 0.24 |
| BC | 0.41 | 0.5 | 0.59 |
| CB | 0.94 | 1.19 | 1.69 |
| CC | 0.55 ~ 1.50 | 0.67 ~ 1.93 | 0.79 ~ 2.80 |
| CD | CC-0.2 | CC-0.28 | CC-0.31 |
| CE | max. 0.31 | max. 0.39 | max. 0.47 |
| CF | p.c.d. 0.75 | p.c.d. 0.87 | p.c.d. 1.18 |
| CG | max. 0.1 | max. 0.12 | max. 0.24 |
| DA | AS568-013(90) | AS568-014(90) | AS568-017(90) |
| DB | AS568-019(90) | AS568-023(90) | AS568-030(90) |
| EY | SR1.18 | SR1.97 | SR3.15 |
| Tightening Torque for Main Body ^{※3} | 23 ft·lb | 37 ft·lb | 59 ft·lb |

Note : ^{※3}. Please follow the tightening torque in the list when mounting Work Support.

Excessive tightening torque causes deformation of the product resulting in malfunction.

Insufficient tightening torque causes looseness of the product resulting in damage of the O-ring and oil leakage.

Contact Bolt Design Dimensions

[※]Reference for designing a contact bolt (attachment) by customer other than the included contact bolt.

| Corresponding Model No. | TNF1000-□ | TNF1140-□ | TNF1340-□ |
|------------------------------------|--------------------|---------------------|---------------|
| EB | 0.21 | 0.33 | 0.4 |
| EC | 0.45 | 0.55 | 0.67 |
| ED | 0.2 | 0.24 | 0.3 |
| EE | 0.39 | 0.39 | 0.47 |
| EF | 0.28 | 0.28 | 0.34 |
| EG | 0.07 | 0.07 | 0.09 |
| EH | C0.03 | C0.04 | C0.05 |
| EX | 5/16-18 UNC | 7/16-14 UNC | 1/2-13 UNC |
| O-ring | AS568-009(70) | AS568-011(70) | AS568-012(70) |
| Tightening Torque for Contact Bolt | 7.4 ft·lb | 12 ft·lb | 30 ft·lb |
| Reference | Material | S45C | |
| | Quenching Hardness | HRC50~55 | |
| | Surface Finishing | Alkaline Blackening | |

Notes :

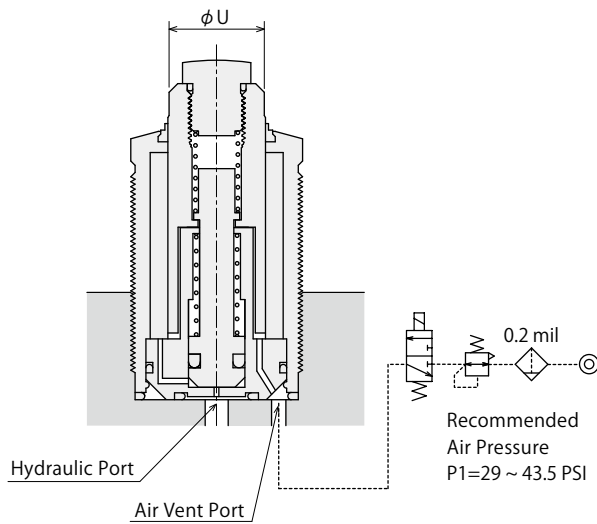
- It should be designed according to the weight of contact bolt and the plunger spring force.
- If using a contact bolt with different dimensions than those shown above, spring force will be different from the values on catalog, and the plunger spring will be damaged leading to malfunctions.

Air Purge Function

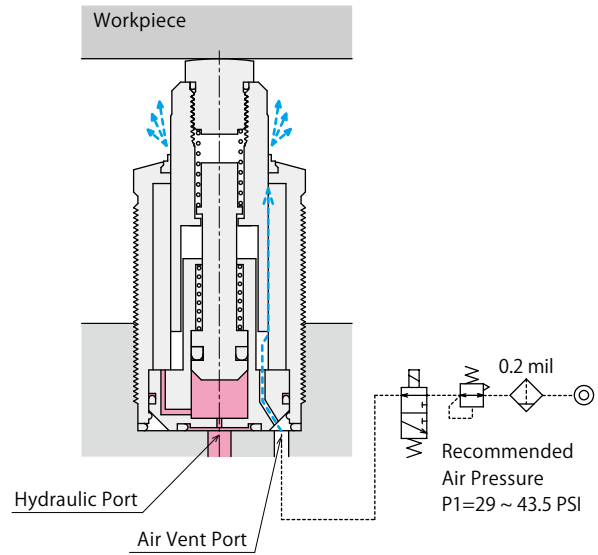
TNF is equipped with the special dust seal that features low friction and high sealing capabilities. However, when using TNF in worse condition, air purge function is available by providing the circuit to the air vent port like the drawing below.

Structure Drawing

TNF Plunger Descending and at Releasing State (Air Supply OFF) ※1



TNF Plunger Ascending and at Locking State (Air Supply ON) ※1



Workpiece Contact Force Formula when Using Air Purge Function ※2

$$\text{Workpiece Contact Force (lbf)} = \text{Plunger Spring Force (lbf)} + \text{Supply Air Pressure (PSI)} \times U^2 \text{ (in)} \times \pi / 4$$

| Model No. | | TNF1000-□ | TNF1140-□ | TNF1340-□ |
|------------------------|----------------------|-----------|-----------|-----------|
| U | in | 0.47 | 0.63 | 0.98 |
| Plunger Spring Force※3 | L :Low Spring Force | 0.9 ~ 1.3 | 1.5 ~ 2.2 | 2.7 ~ 4.2 |
| | H :High Spring Force | 1.2 ~ 1.8 | 2.0 ~ 3.0 | 3.5 ~ 7.5 |

Notes :

- ※2. Please prepare a stopper if necessary when using light and/or thin workpiece. Otherwise it might be pushed up by work support.
- ※3. The plunger spring force indicates the spring design value. It may vary depending on sliding resistance of the plunger and characteristic of the spring , etc. Please read it as a reference value of workpiece contact force.

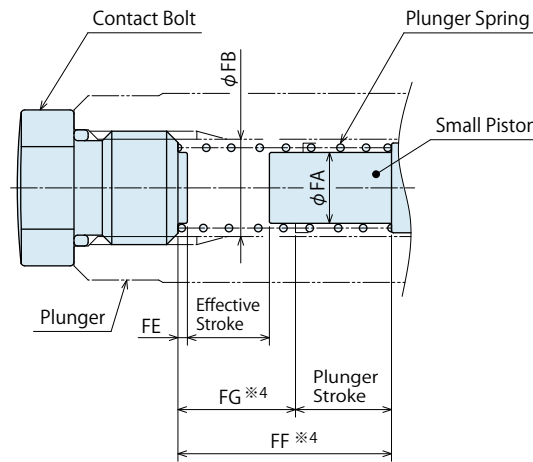
Notes

- ※1. When the plunger is descending, shut off the air supply. The plunger does not go back when air is supplied.
 1. If the plunger ascends too fast, it may bounce back and locks itself resulting in a gap with the workpiece, and possible damage to the internal parts due to the impact. Set the plunger action time at 0.5-1.0 sec. to adjust the air supply with the flow control valve with check valve (meter-in), and make sure that there is no clearance with the workpiece for operation.
 2. Air cannot be vented as the air supply pressure is too low because the cracking pressure at the dust seal lip is about 14.5 psi.

● Plunger Spring Design Dimension

※Reference for designing a plunger spring by customer other than the included plunger spring.

※This drawing shows the released state.



(in)

| Corresponding Model No. | TNF1000-□ | TNF1140-□ | TNF1340-□ |
|-------------------------|-----------|-----------|-----------|
| FA | 0.20 | 0.24 | 0.30 |
| FB | 0.26 | 0.33 | 0.41 |
| FE | 0.04 | 0.04 | 0.04 |
| FF*4 | 0.59 | 0.69 | 0.89 |
| FG*4 | 0.34 | 0.38 | 0.42 |
| Plunger Stroke | 0.26 | 0.31 | 0.47 |
| Effective Stroke | 0.24 | 0.30 | 0.45 |

Note :

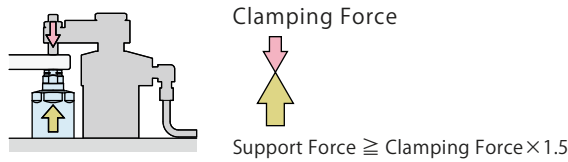
※ 4. When designing a spring, make sure that the spring set length is below FF dimension and the spring contact length is below FG dimension.

Cautions

● Notes for Design

1) Check Specifications

- Please use each product according to the specifications.
- When using a work support opposite to the clamp, set the support force at more than 1.5 times the clamping force.



2) Notes for Circuit Design

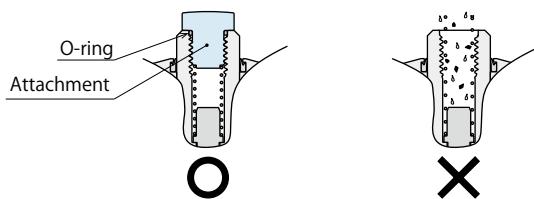
- Please read "Notes on Hydraulic Cylinder Speed Control Unit" for proper hydraulic circuit design. Improper circuit design may lead to malfunctions and damages. (Refer to P.13)

3) Install a temporary stopper for a workpiece if necessary.

- When multiple work supports are used for a light workpiece, the plunger spring force may be higher than the workpiece weight, causing the workpiece to be pushed up.

4) An attachment is required for the plunger.

- Make sure that an attachment is installed to the plunger. Otherwise, the plunger does not advance since the plunger spring is free to move.
- Make sure to set the O-ring to the attachment. Otherwise, cutting fluid or other contaminants will get in easily, causing malfunction.



5) Protect the plunger surface when using on a welding fixture.

- If spatter attaches to the sliding surface it may lead to a sliding failure and an insufficient support function.

6) Do not expose the plunger directly to high-pressure coolant.

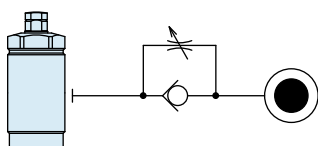
- It will cause intrusion of the coolant and damage to the internal components.

7) For Using on a Lathe, High-Speed Tilting Table, and etc.

- When using in a cycle where the centrifugal force is acting, the work support should be in a locked state. Please contact us for further information.

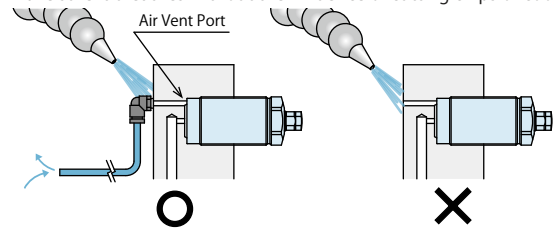
8) Adjust the plunger operation time with flow rate.

- A rough guideline for the full stroke is between 0.5 and 1 second.
- As with single-action cylinders, use a flow regulating valve with a check valve (meter-in) in consideration of the decreasing speed at release.
- If the action speed is too fast, the plunger may bounce back and locks itself resulting in a gap with the workpiece.
- Use a flow regulating valve with check valve that has 14.5 psi or less of cracking pressure. If the cracking pressure is too high the plunger will not move at the time of release.



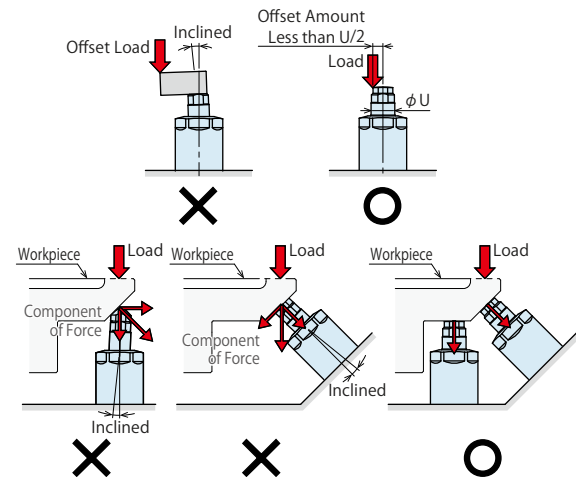
9) Appropriate Measures for Air Vent Port

- The work support, although only slightly, breathes like a single-acting cylinder. Consider the environment and avoid cutting fluid, coolant or any contaminants.
- If using it without air vent port, it will not function properly. Make sure it breathes without the influence of cutting chips or coolant.



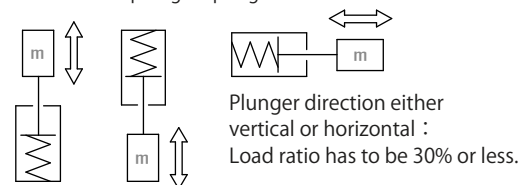
10) Make sure that offset load and component of force do not affect the product.

- If using the product as illustrated below, the displacement against load will be increased. Also large load will damage the internal parts.



11) The Weight of an Attachment

- When designing an attachment, make sure the attachment weight is 30% or less of the plunger spring force.

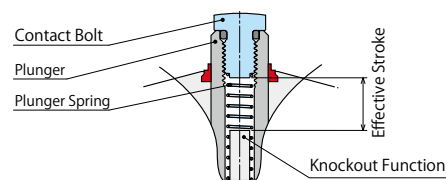


- Ex.) In case of TNF1140-L with the plunger spring force 1.5–2.2lbf. The maximum weight of the contact bolt = 1.5 × 0.3 = 0.45lbf. Since it may vary depending on sliding resistance of the plunger and characteristic of the spring, it is recommended to design the contact bolt as light as possible.

- The dimensions of the mounting thread area need to be processed according to the design dimensions for contact bolts as shown on the respective product pages.

The knockout function is used to release fixation of plunger spring and adherence after machine stop for a long time.

Using an attachment with different thread part dimension leads to inappropriate spring force and effective stroke, causing damage and malfunctions.



● Notes for Design

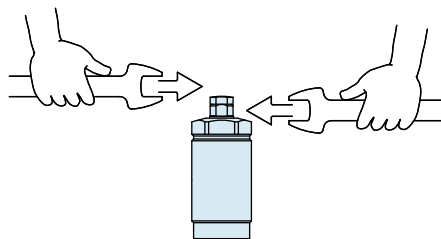
- Notes on Mounting Method of TNF (Threaded Model)
 - When mounting TNF, make sure the base is horizontal to the bearing surface, and the load is received at the base.

● Installation Notes

- Check the Usable Fluid
 - Please use the appropriate fluid by referring to the Hydraulic Fluid List (P.13).
- Preparation for Piping
 - The pipeline, piping connector and fixture circuits should be cleaned by thorough flushing.
 - The dust and cutting chips in the circuit may lead to fluid leakage and malfunction.
 - There is no filter provided with Kosmek ' s product except for a part of valves which prevents foreign materials and contaminants from getting into the circuit.
- Applying Sealing Tape
 - Wrap with tape 1 to 2 times following the screwing direction.
 - Pieces of the sealing tape can lead to air leakage and malfunction.
 - Please implement piping construction in a clear environment to prevent anything getting in products.
- Installation of the Product
 - When mounting TNF (Threaded Model), be careful not to damage the O-ring for sealing the base. Tighten them with the torque shown in the table below.

| Model No. | Thread Size | Tightening Torque (ft·lb) |
|----------------|--------------|---------------------------|
| TNF1000 | 1-16 UN | 23 |
| TNF1140 | 1" 1/4-16 UN | 37 |
| TNF1340 | 1" 3/4-16 UN | 59 |

- Apply an adequate amount of grease to the O-ring.
 - If it is mounted under dry state, the O-ring may have twisting or be defective.
 - If it is tightened with higher torque, it may lead to malfunction.
- Replacement of Attachment
 - Release supplying pressure to the work support before replacing the attachment.
 - Do not lose the plunger spring when the attachment (contact bolt) is removed.
 - When mounting the attachment, stop the plunger with a spanner at edge and tighten it with torque as shown in the table below.

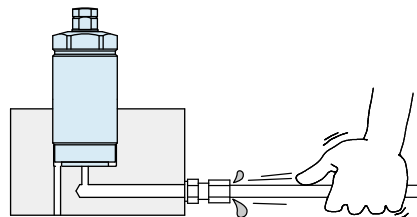


| Model No. | Head Thread Size | Tightening Torque (ft·lb) |
|----------------|------------------|---------------------------|
| TNF1000 | 5/16-18 UNC | 7.4 |
| TNF1140 | 7/16-14 UNC | 12 |
| TNF1340 | 1/2-13 UNC | 30 |

6) Air Bleeding of the Hydraulic Circuit

- If the hydraulic circuit has excessive air, the action time may become very long. If air enters the circuit after connecting the hydraulic port or under the condition of no air in the oil tank, please perform the following steps.

- Reduce hydraulic pressure to less than 290 psi.
- Loosen the cap nut of pipe fitting closest to the clamp by one full turn.
- Shake the pipeline to loosen the outlet of pipe fitting.
Hydraulic fluid mixed with air comes out.



- Tighten the cap nut after bleeding.
- It is more effective to release air at the highest point inside the circuit or at the end of the circuit.

7) Checking Looseness and Retightening

- At the beginning of the machine installation, the bolt and nut maybe tightened lightly. Check the looseness and re-tighten as required.

Cautions

Hydraulic Fluid List

| Maker | ISO Viscosity Grade ISO-VG-32 | |
|------------------------|-------------------------------|-----------------------------|
| | Anti-Wear Hydraulic Oil | Multi-Purpose Hydraulic Oil |
| Showa Shell Sekiyu | Tellus S2 M 32 | Morlina S2 B 32 |
| Idemitsu Kosan | Daphne Hydraulic Fluid 32 | Daphne Super Multi Oil 32 |
| JX Nippon Oil & Energy | Super Hyrando 32 | Super Mulpus DX 32 |
| Cosmo Oil | Cosmo Hydro AW32 | Cosmo New Mighty Super 32 |
| ExxonMobil | Mobil DTE 24 | Mobil DTE 24 Light |
| Matsumura Oil | Hydol AW-32 | |
| Castrol | Hyspin AWS 32 | |

Note : Please contact manufacturers when customers require products in the list above.

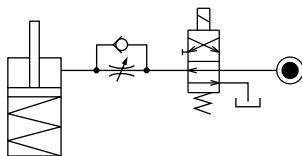
Notes on Hydraulic Cylinder Speed Control Unit



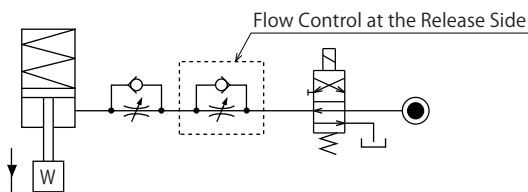
Please pay attention to the cautions below. Design the hydraulic circuit for controlling the action speed of hydraulic cylinder. Improper circuit design may lead to malfunctions and damages. Please review the circuit design in advance.

Flow Control Circuit for Single Acting Cylinder

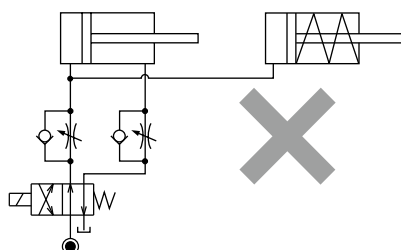
For spring return single acting cylinders, restricting flow during release can extremely slow down or disrupt release action. The preferred method is to control the flow during the lock action using a valve that has free-flow in the release direction. It is also preferred to provide a flow control valve at each actuator.



Accelerated clamping speed by excessive hydraulic flow to the cylinder may sustain damage. In this case add flow control to regulate flow. (Please add flow control to release flow if the lever weight is put on at the time of release action when using swing clamps.)

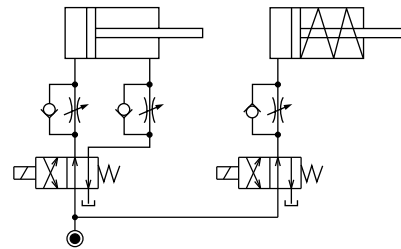


Single acting components should not be used in the same flow control circuit as the double acting components. The release action of the single acting cylinders may become erratic or very slow.

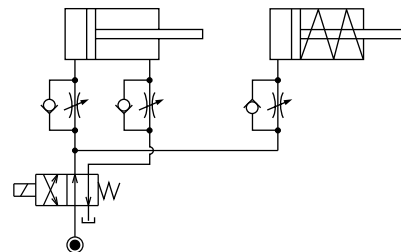


Refer to the following circuit when both the single acting cylinder and double acting cylinder are used together.

○ Separate the control circuit.



○ Reduce the influence of double acting cylinder control unit. However, due to the back pressure in tank line, single action cylinder is activated after double action cylinder works.



● Notes on Handling

- 1) It should be operated by qualified personnel.
 - Machines and devices with hydraulic and pneumatic products should be operated and maintained by qualified personnel.
- 2) Do not operate or remove the product unless the safety protocols are ensured.
 - ① Machines and devices can only be inspected or prepared when it is confirmed that the safety devices are in place.
 - ② Before the product is removed, make sure that the above-mentioned safety devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
 - ③ After stopping the product, do not remove until the temperature drops.
 - ④ Make sure there is no trouble/issue in the bolts and respective parts before restarting a machine or device.
- 3) Do not touch the plunger while the work support is working. Otherwise, your hands may be injured due to clinching.



- 4) Do not disassemble or modify.
 - If the equipment is taken apart or modified, the warranty will be voided even within the warranty period.

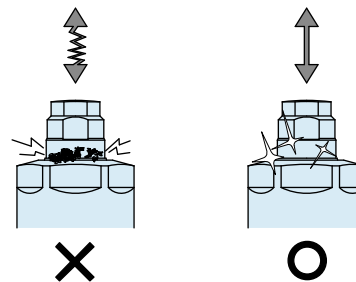
● Warranty

- 1) Warranty Period
 - The product warranty period is 18 months from shipment from our factory or 12 months from initial use, whichever is earlier.
- 2) Warranty Scope
 - If the product is damaged or malfunctions during the warranty period due to faulty design, materials or workmanship, we will replace or repair the defective part at our expense. Defects or failures caused by the following are not covered.
 - ① If the stipulated maintenance and inspection are not carried out.
 - ② If the product is used while it is not suitable for use based on the operator's judgment, resulting in defect.
 - ③ If it is used or operated in an inappropriate way by the operator. (Including damage caused by the misconduct of the third party.)
 - ④ If the defect is caused by reasons other than our responsibility.
 - ⑤ If repair or modifications are carried out by anyone other than Kosmek, or without our approval and confirmation, it will void warranty.
 - ⑥ Other caused by natural disasters or calamities not attributable to our company.
 - ⑦ Parts or replacement expenses due to parts consumption and deterioration. (Such as rubber, plastic, seal material and some electric components.)

Damages excluding from direct result of a product defect shall be excluded from the warranty.

● Maintenance and Inspection

- 1) Removal of the Machine and Shut-off of Pressure Source
 - Before the machine is removed, make sure that safety devices and preventive devices are in place. Shut off the pressure and power source, and make sure no pressure exists in the air and hydraulic circuits.
 - Make sure there is no abnormality in the bolts and respective parts before restarting.
- 2) Regularly clean the area around the piston rod and plunger.
 - If it is used when the surface is contaminated with dirt, it may lead to packing seal damage, malfunctioning and fluid leakage.



- 3) If disconnecting by couplers, air bleeding should be carried out on a regular basis to avoid air mixed in the circuit.
- 4) Regularly tighten piping joint, attachment, work support body and others to ensure proper use.
- 5) Make sure the hydraulic fluid has not deteriorated.
- 6) Make sure there is a smooth action without an irregular noise.
 - Especially when it is restarted after left unused for a long period, make sure it can be operated correctly.
- 7) The products should be stored in the cool and dark place without direct sunshine or moisture.
- 8) Please contact us for overhaul and repair.

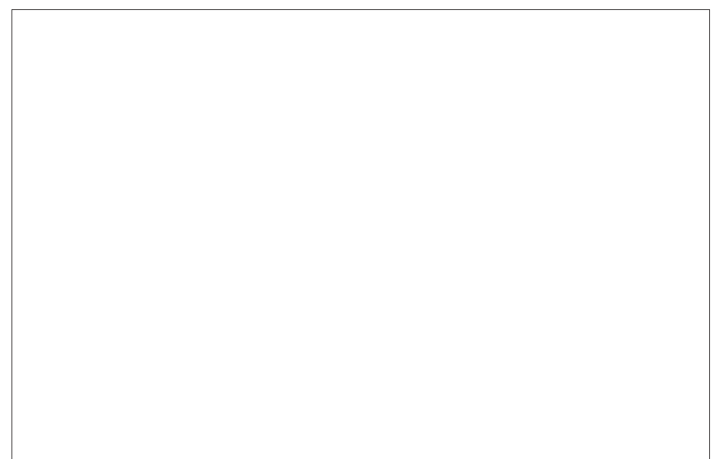


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- For Further Information on Unlisted Specifications and Sizes, Please call us.
- Specifications in this Leaflet are Subject to Change without Notice.



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