HEAVY DUTY
THD SERIES
HYDRAULIC PLANETARY WINCH

USER & INSTALLATION MANUAL

Your is our SUCCESS

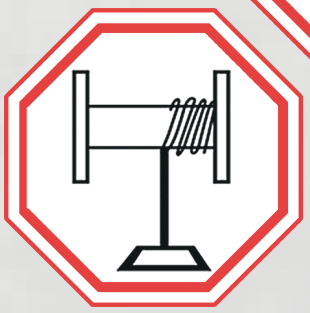
READ THIS MANUAL CAREFULLY AND FOLLOW THE INSTRUCTIONS

For your safety, please read the user manual before use.

Do not touch with bare hands. Do not operate.

A safe distance must be maintained from the operating area.

Do not lift people with winch!



Always keep last 5 winding cable on drum.

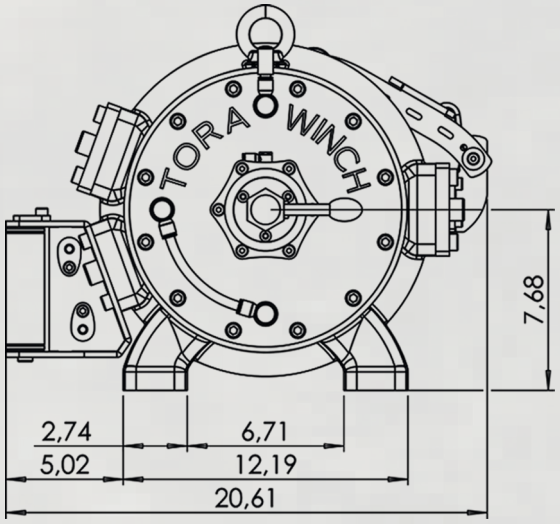
A helmet must be worn at all times.

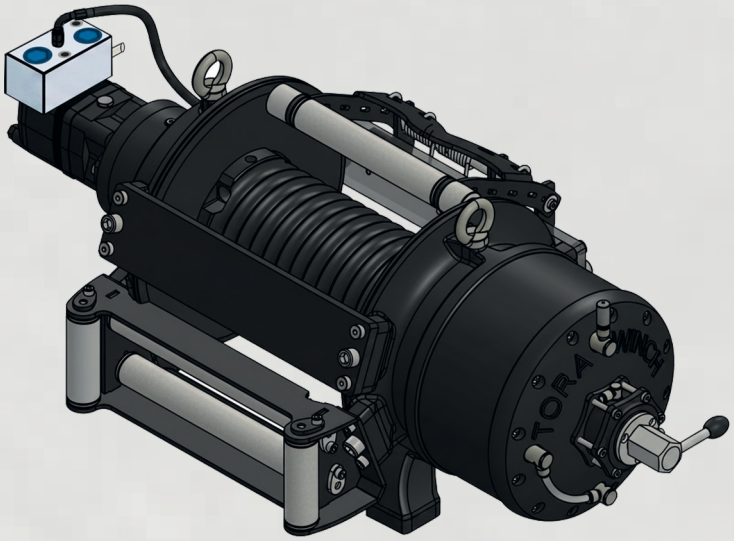
Gloves must be worn at all times.

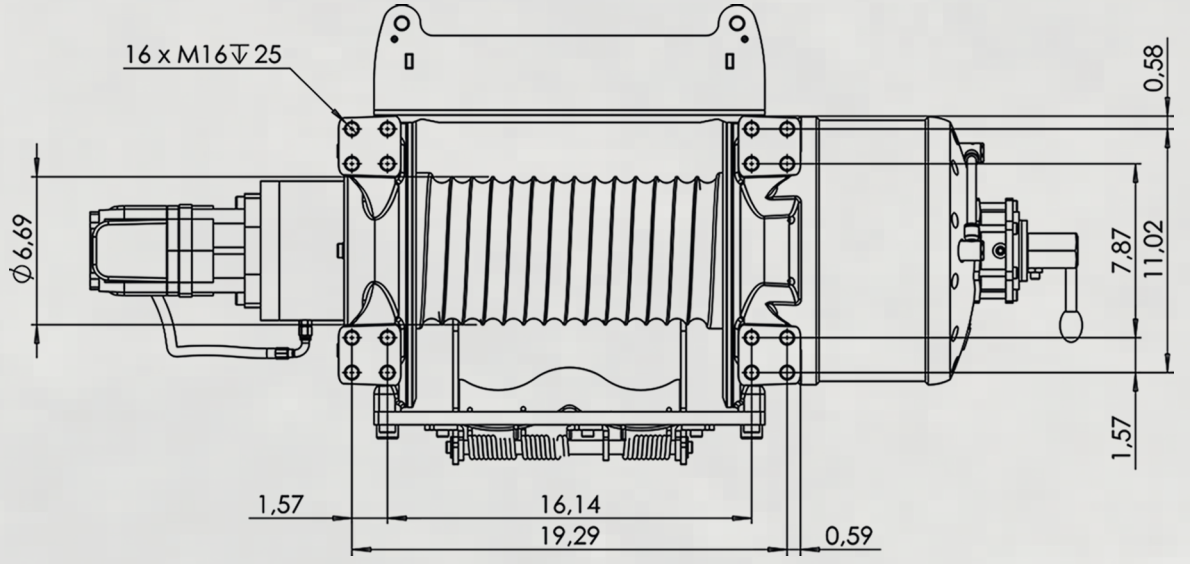
Protective goggles must be worn at all times.

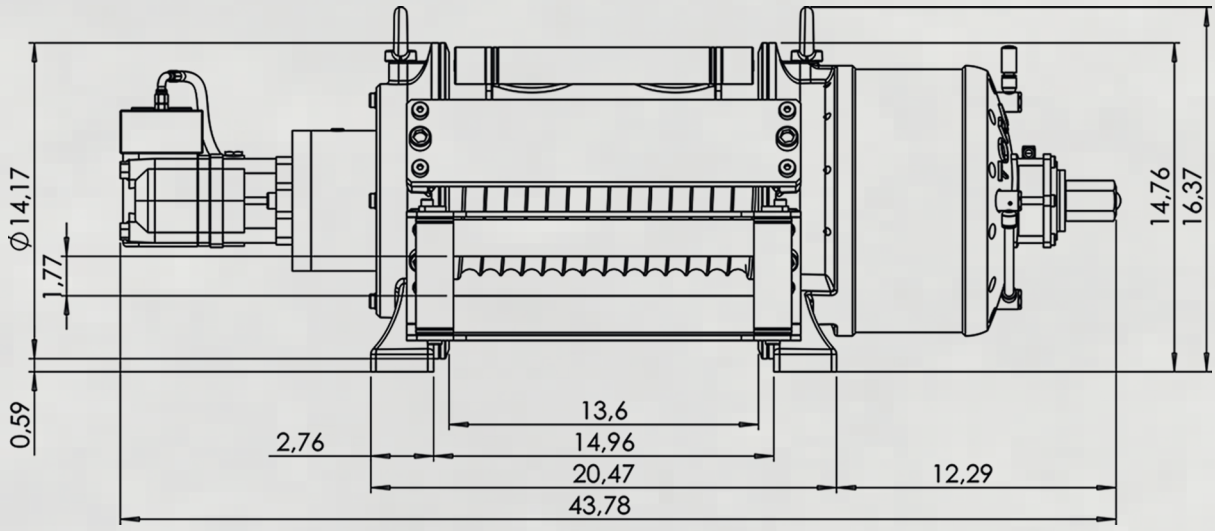
Protective steel-toe footwear must be worn at all times.

2.1 TECHNICAL DRAWING

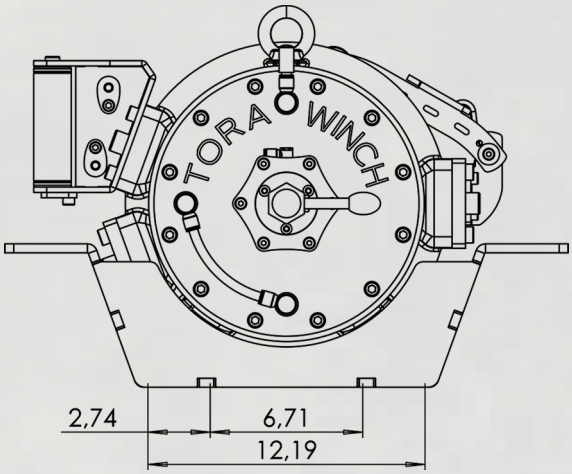


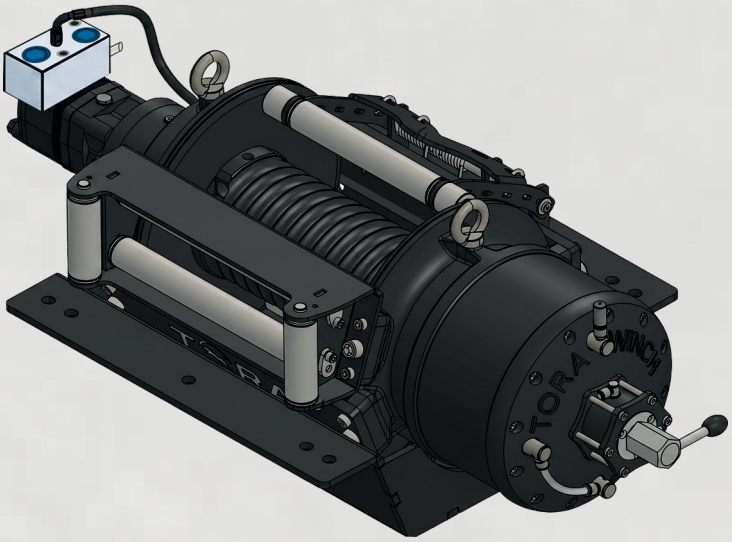


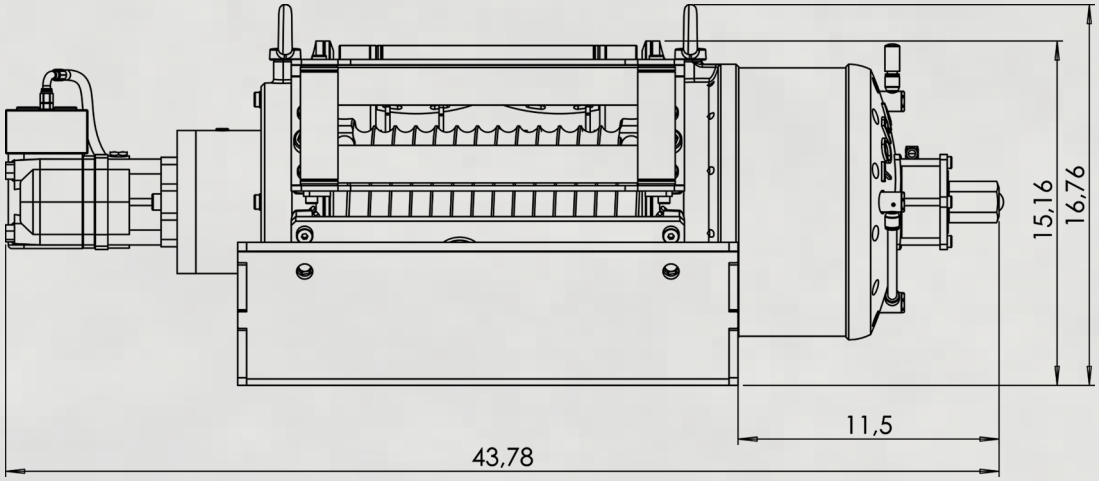


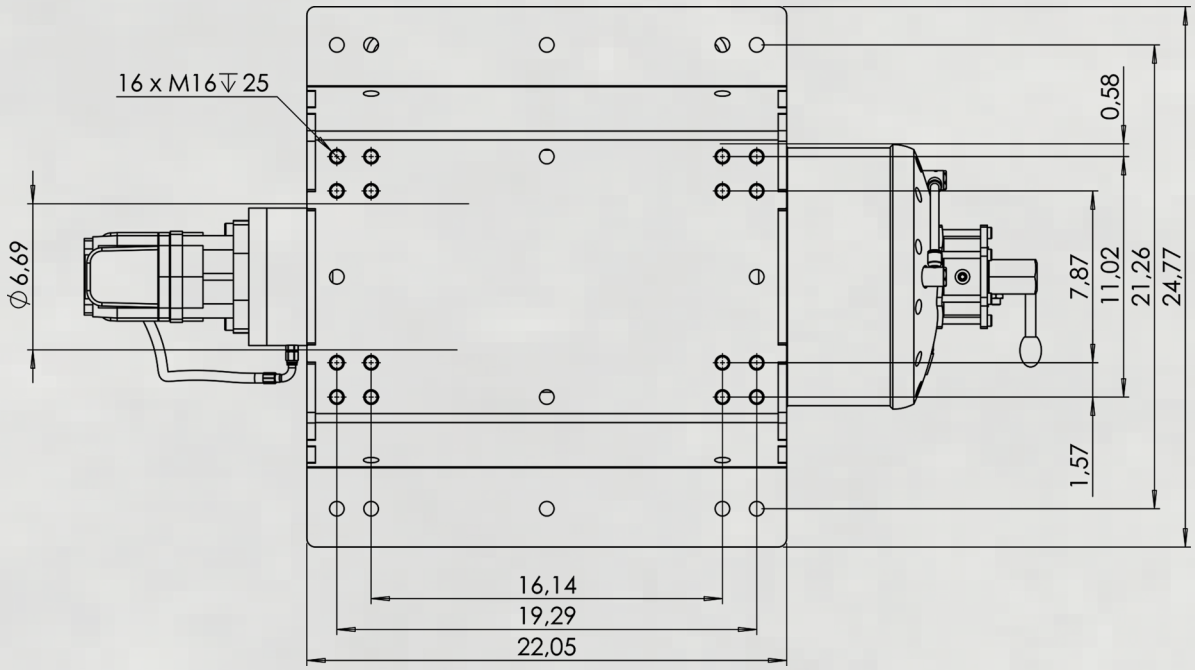


2.2.TECHNICAL DRAWING WITH BOTTOM PATTERN



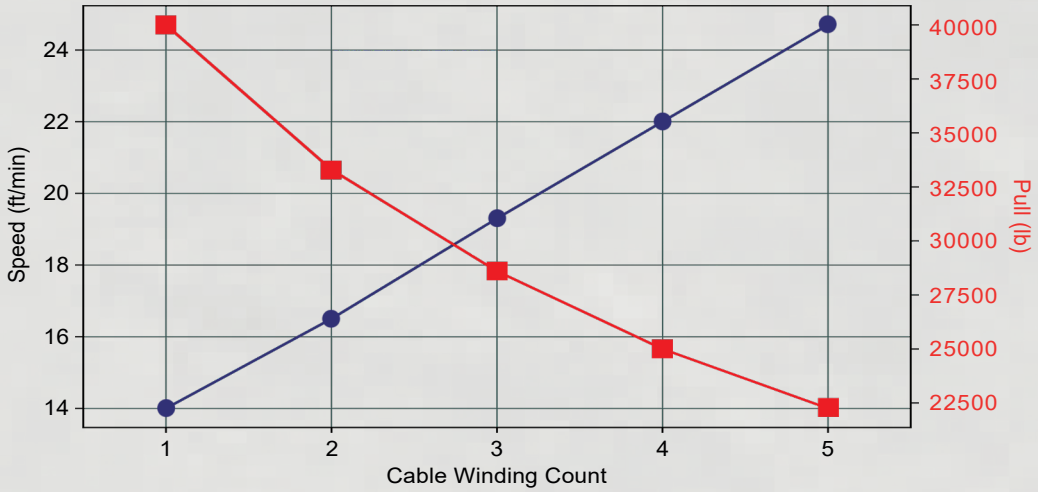






THD-40K

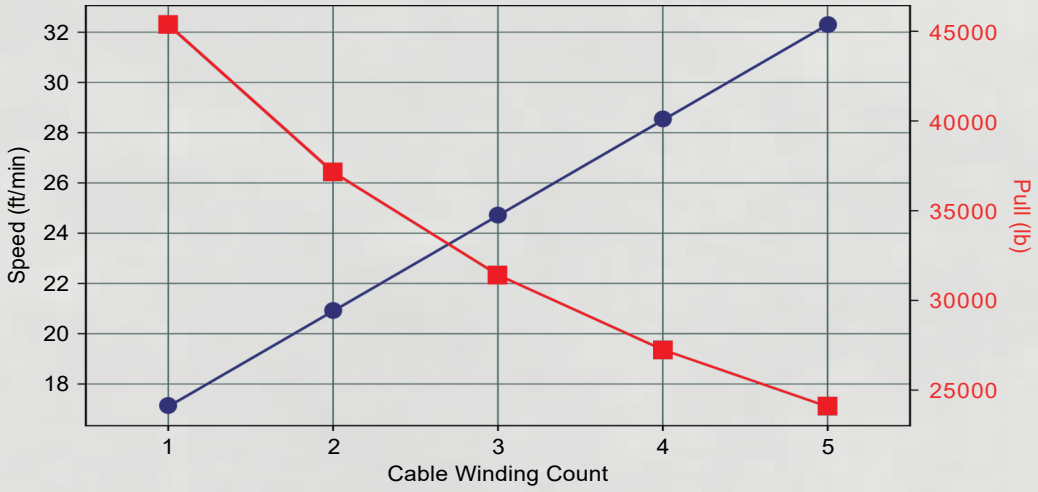
Cable Winding Count	Pulling Capacity (lbs)	Winding Speed (ft-min)	Rope Lenght (ft)
1	40000	14,00	32
2	33300	16,50	70
3	28600	19,30	115
4	25000	22,00	165
5	22250	24,70	220



**The above values are calculated based on a 19 GPM flow rate , a 12.2 in³/rev hydraulic motor, and an 0,7" diameter cable. Values are calculated for Horizontal Pulling Work*

THD-45K

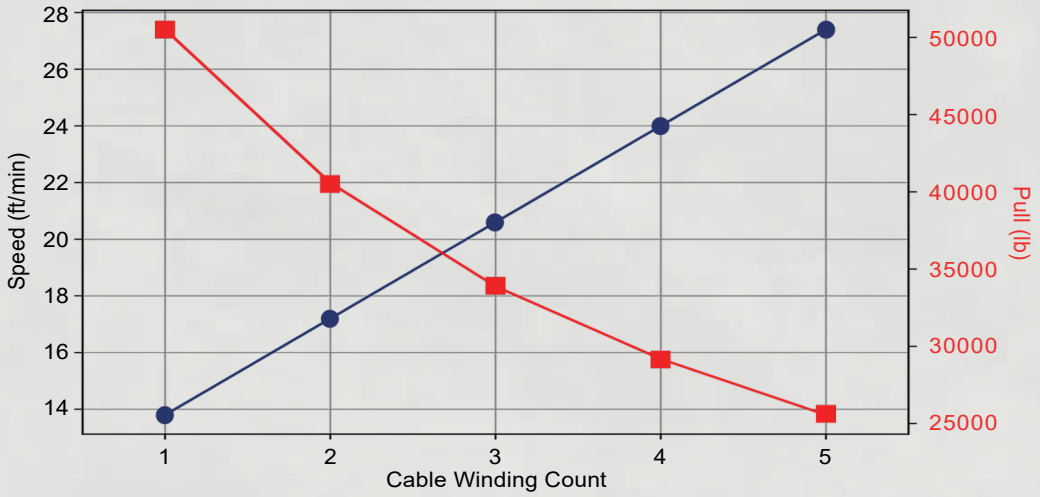
Cable Winding Count	Pulling Capacity (lbs)	Winding Speed (ft-min)	Rope Lenght (ft)
1	45000	17,00	30
2	37150	20,90	63
3	31400	24,70	102
4	27250	28,50	148
5	24080	32,30	195



**The above values are calculated based on a 19 GPM flow rate , a 9.8 in³/rev hydraulic motor, and an 0,78" diameter cable. Values are calculated for Horizontal Pulling Work*

THD-50K

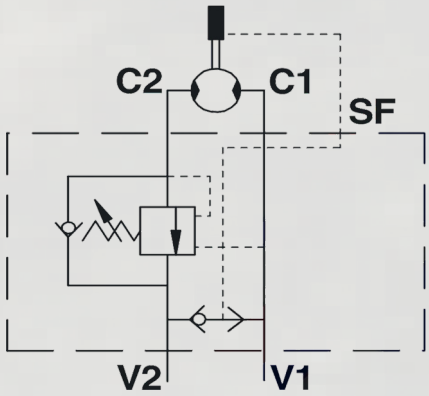
Cable Winding Count	Pulling Capacity (lbs)	Winding Speed (ft-min)	Rope Lenght (ft)
1	50000	14,00	24
2	40580	17,20	55
3	33880	20,60	90
4	29180	24,00	135
5	25560	27,40	180



**The above values are calculated based on a 19 GPM flow rate , a 12.2 in³/rev hydraulic motor, and an 0,86" diameter cable. Values are calculated for Horizontal Pulling Work*

	THD-40K	THD-45K	THD-50K
Maximum Pulling Force	40.000 lbs	45.000 lbs	50.000 lbs
Rope Diameter	0,70”	0,78"	0,86"
Maximum Pump Flow	19 gpm	19 gpm	19 gpm
Maximum Operating Pressure	2465 psi	2465 psi	2465 psi
Recommeded Gear Oil Product	80w 90 - (77 fl-oz.)	80w 90 - (77 fl-oz.)	80w 90 - (77 fl-oz.)
Weight	540 lbs	540 lbs	540 lbs
Maximum Rope Lenght	275 ft	250 ft	225 ft
Hydromotor	200cc (12.2 ci)	160cc (9.8 ci)	200cc (12.2 ci)
Gear Ratio	48,57/1	48,57/1	48,57/1

4.1. Hydraulic Diagram of Counter-Balance Valve



Use and Operation

These valves are used to control the motor rotation and block it in one direction. In order to have the load under control and avoid its inertia being carried away the valve will prevent any cavitation. Direct flange is ideal for Danfoss type OMS motors and provides maximum safery, very low pressure drops and robust installation.

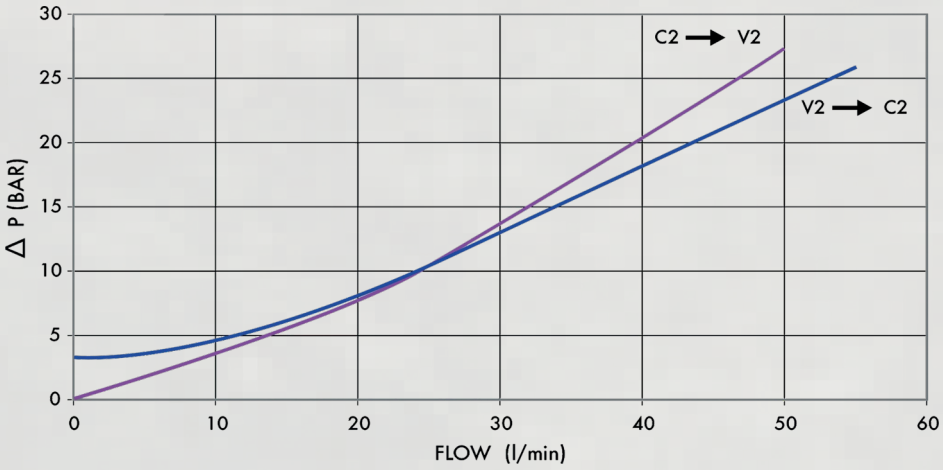
4.2. Materials and Features

Body	: zinc-plated steel.
Internal parts	: hardened and ground steel.
Seals	: BUNA N standard.
Leakage	: negligible leakage.
Standard setting	: 320 Bar.

Valve setting must be at least 1.3 times more than load pressure in order to enable the valve to dose even when subjected to the maximum load pressure.

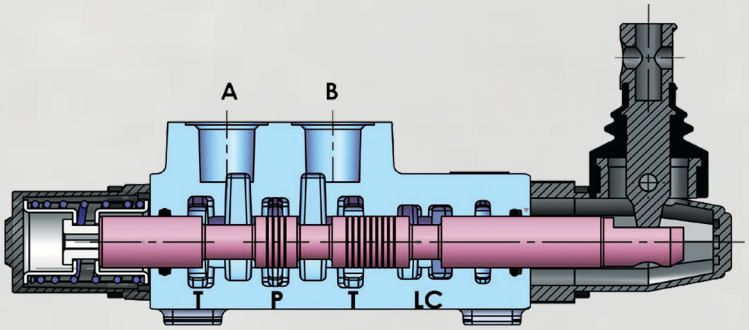
4.3. Connections

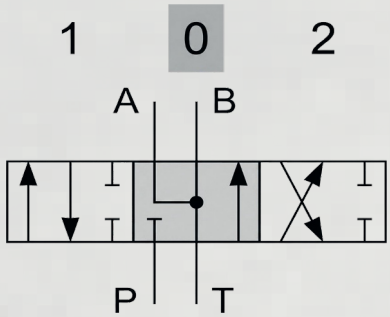
Connect V1 and V2 to the supply, C1 to the free flow side of the motor and C2 to the motor's side

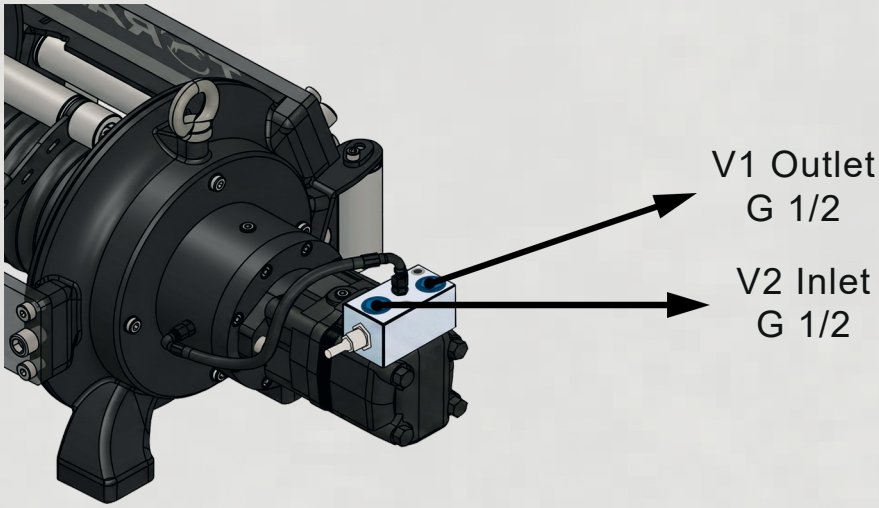


4.4. Hydraulic Diagram of Hydraulic Control Valve

Valve's a-b line must be opened (which is need to operate the hydraulic winch) otherwise hydraulic brake will release the load

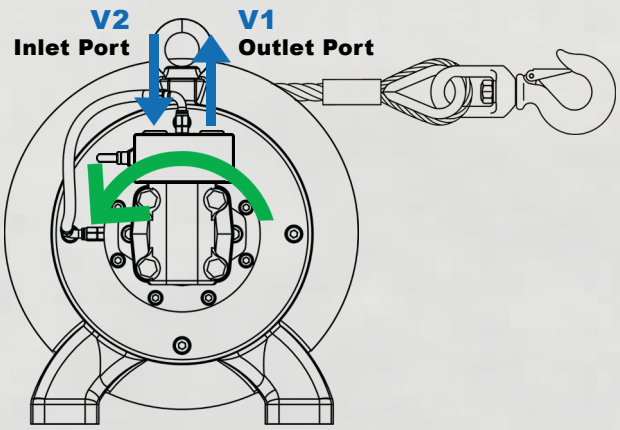


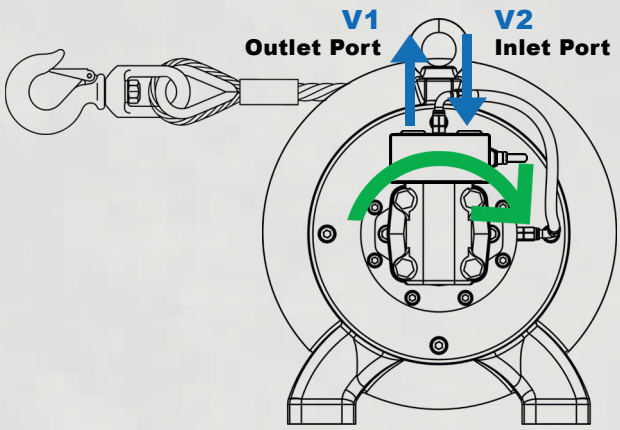




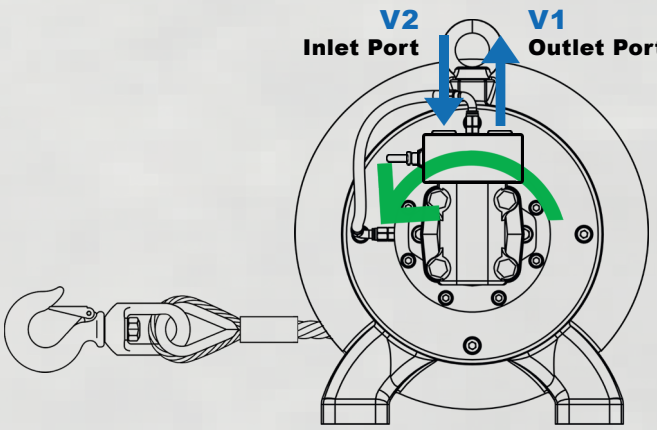
WARNING!!!
If the cable is not wrapped in correct rotation, the winch brake valve will not hold the load.

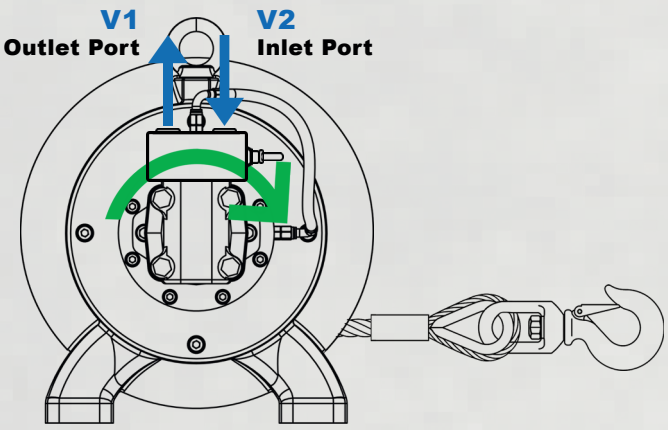
Over Drum Wire Cable Mounting





Under Drum Wire Cable Mounting

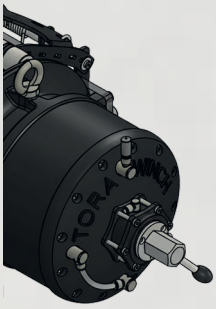




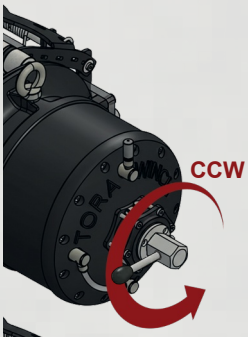
WARNING!!!
Make sure that the clutch is fully engaged before pulling a load. Failure to fully engage the clutch during winching operations may result in sudden drum disengagement, causing the load to drift unexpectedly.

WARNING!!!
Do not disengage the clutch while the winch is under load.

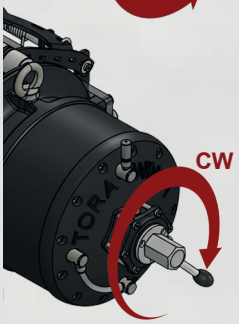
6.1. Manual Clutch



Engage Position

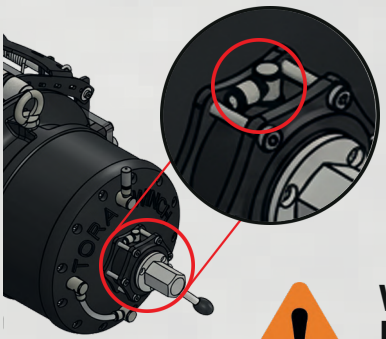


Rotate 270° CCW to **Disengage**



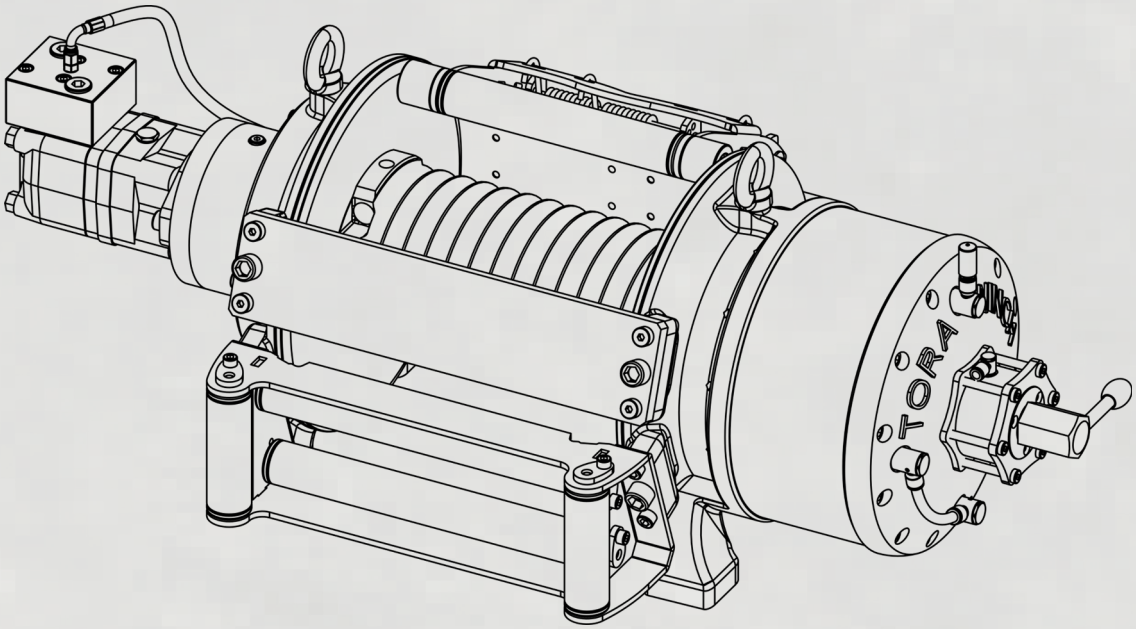
Rotate back 270° CW to **Engage**

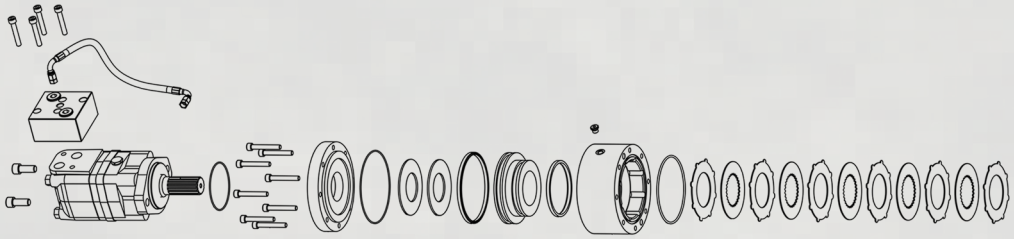
6.2. Pneumatic Clutch

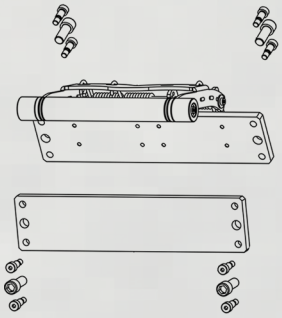


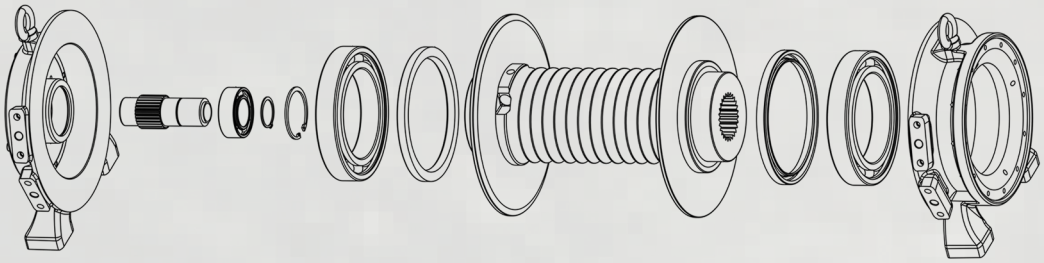
- ▶ Apply 87 PSI air pressure to disengage the clutch.
- ▶ Maintain air pressure until the load has been pulled.
- ▶ Remove air pressure to engage the clutch.

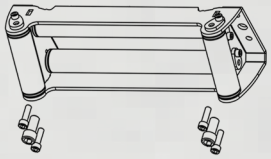
WARNING!!!
Keep the air supply filtered and dry. Allowing moisture to enter the winch may damage internal components.

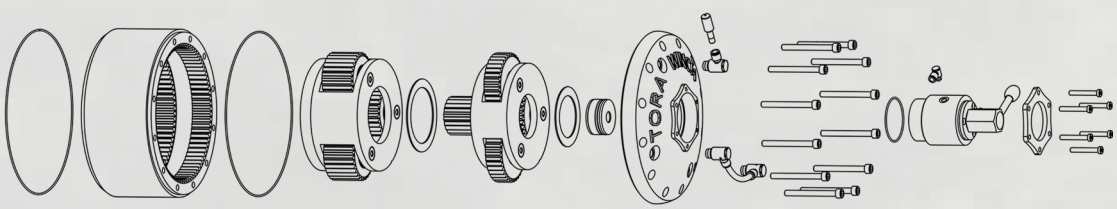

TORA





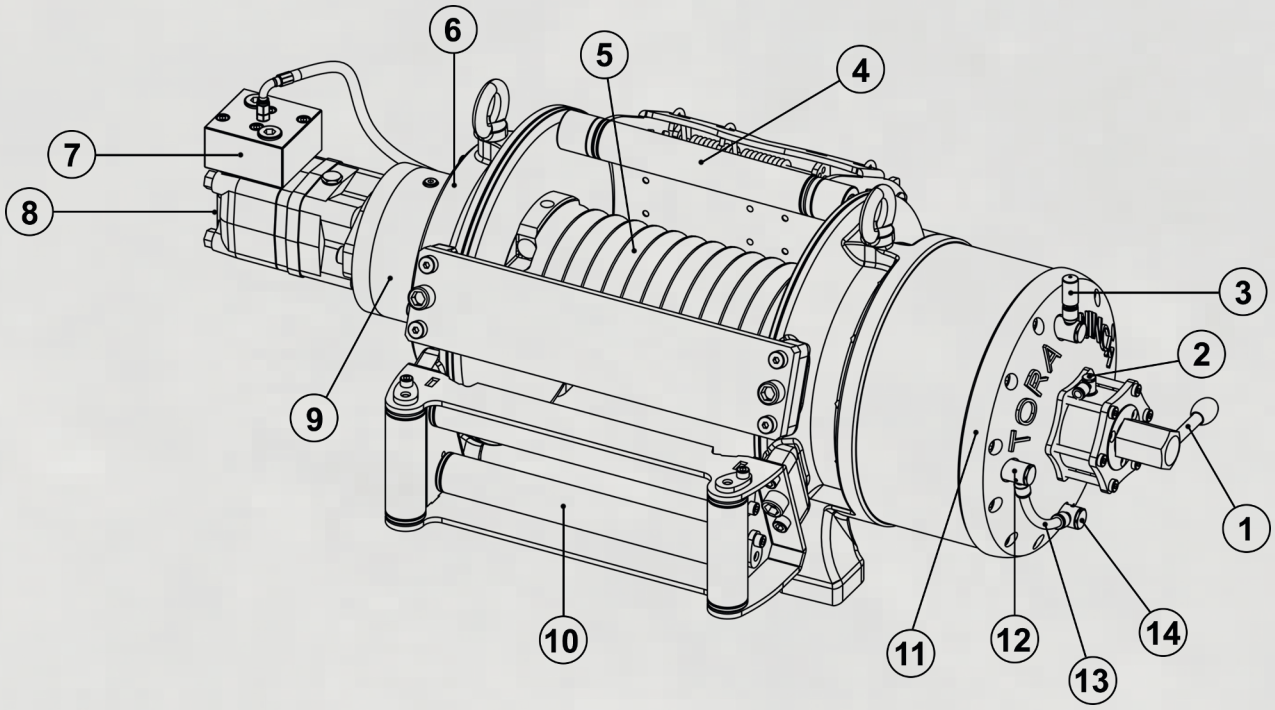




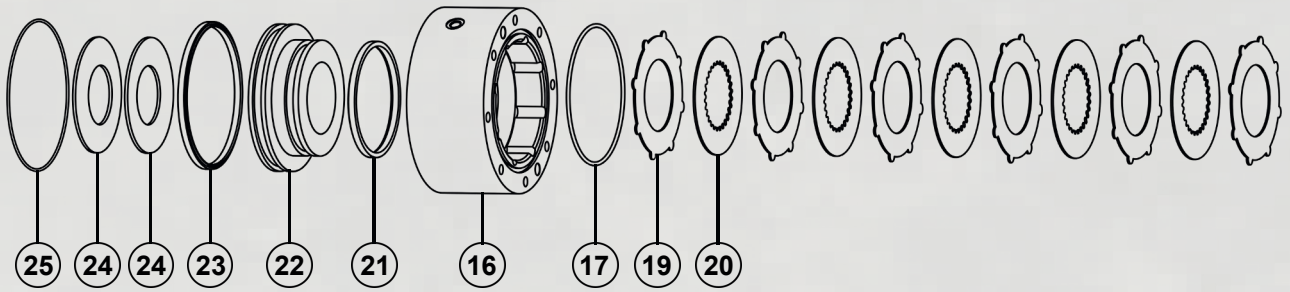

TORA

GENERAL

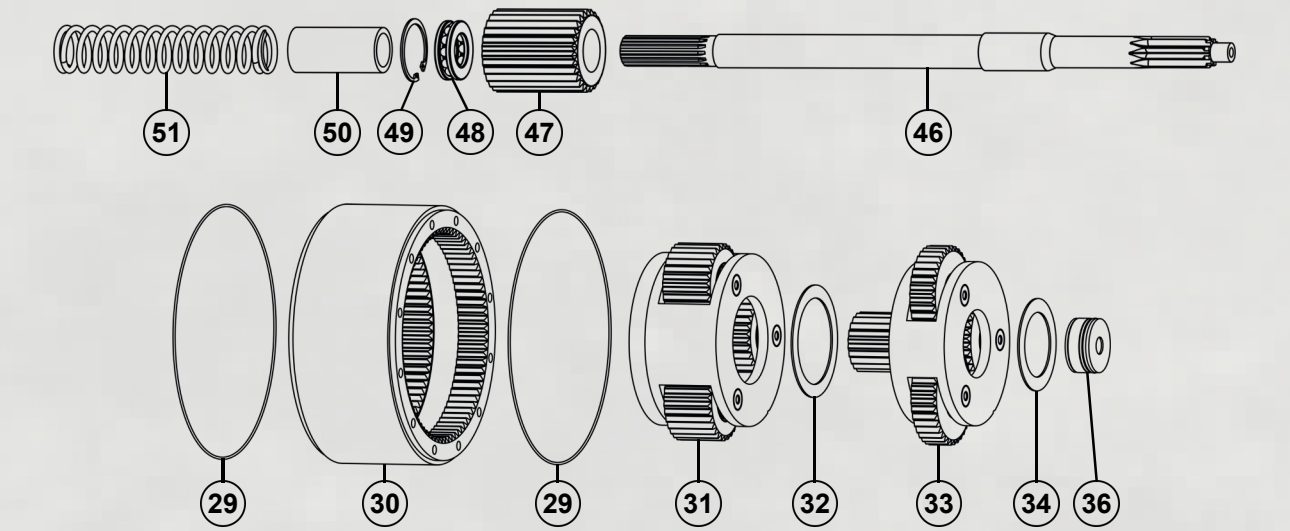
This technical drawing is for THD-40K, THD-45K, THD-50K models.



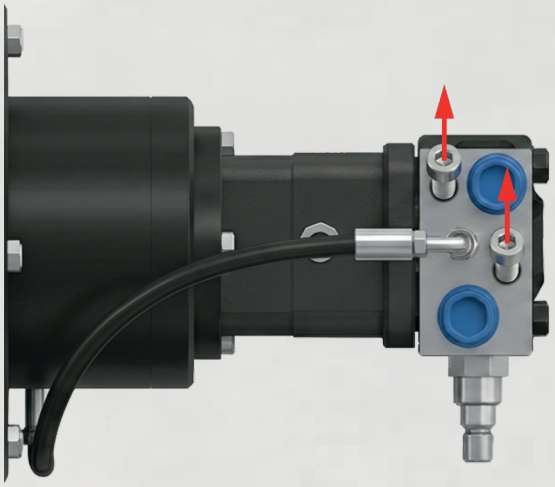
No	Code	Description
1	THD-SP-1	Manual Clutch
2	THD-SP-2	Pneumatic Clutch
3	THD-SP-3	Air Breather & Oil Filling
4	THD-SP-4	Cable Tensioner
5	THD-SP-5	Drum
6	THD-SP-6	Back Cover
7	THD-SP-7	Counter-Balance Valve
8	THD-SP-8	Hydromotor
9	THD-SP-9	Brake Body
10	THD-SP-10	4-Way Roller Fairlead
11	THD-SP-11	Gearbox Cover
12	THD-SP-12	Oil Level Plug
13	THD-SP-13	Oil Hose
14	THD-SP-14	Drain Plug



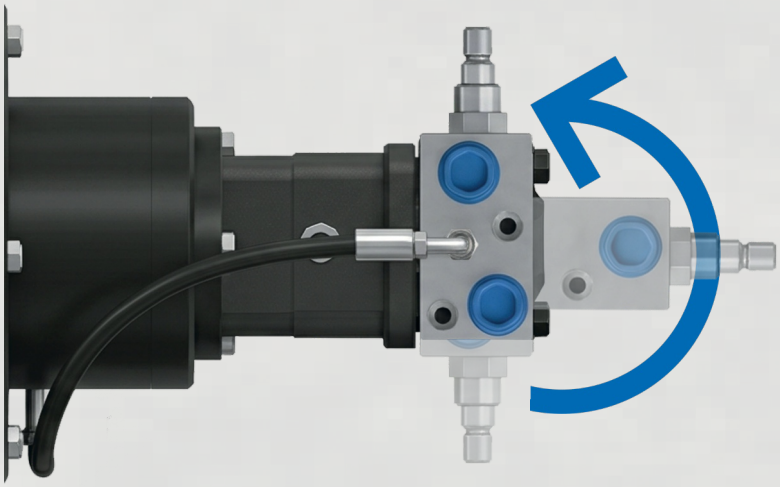
Code	Description
THD-KIT-16	Brake Disk Kit



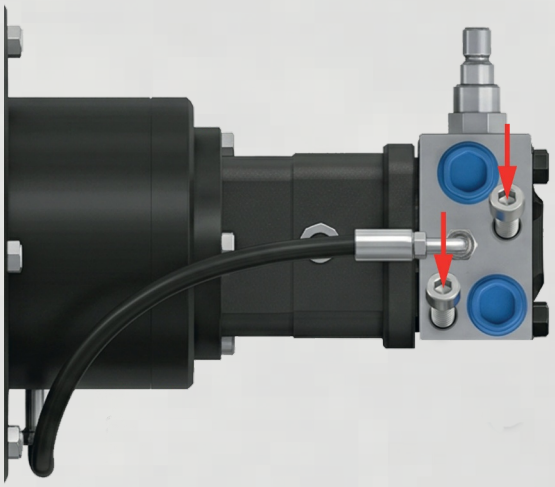
Code	Description
THD-KIT-30	Planetary Gear Repair Kit



STEP 1
Remove the bolts



STEP 2
Turn 180°



STEP 3
Tighteen the bolts

9.1. ROLLING RESISTANCE TABLE

No	Surface / Condition	C_{rr}
1	Steel wheels on rail	0.001–0.003
2	Rubber tires on concrete	0.01–0.02
3	Rubber tires on gravel	0.02–0.05
4	Skidding (no wheels)	0.3–0.6
5	Steel wheel on rail	0.001 – 0.003
6	Steel wheel on steel beam	0.002 – 0.005
7	Hard rubber tire on concrete	0.01 – 0.015
8	Pneumatic tire on concrete	0.015 – 0.02
9	Pneumatic tire on asphalt	0.02 – 0.025
10	Forklift (loaded, indoor floor)	0.02 – 0.03
11	Gravel (compacted)	0.02 – 0.04
12	Gravel (loose)	0.04 – 0.08
13	Dirt road (firm, dry)	0.03 – 0.06
14	Dirt road (soft/wet)	0.06 – 0.10
15	Grass (firm ground)	0.04 – 0.08
16	Wood on wood	0.2 – 0.5
17	Steel on steel (dry)	0.1 – 0.3
18	Steel on concrete	0.3 – 0.6
19	Rubber dragging on concrete	0.5 – 0.8
20	Sand (firm, wet)	0.05 – 0.10
21	Sand (dry, loose)	0.10 – 0.30
22	Mud	0.10 – 0.25
23	Snow (packed)	0.05 – 0.15
24	Snow (loose/deep)	0.15 – 0.30
25	Conveyor rollers (good condition)	0.01 – 0.02
26	Conveyor rollers (poor condition)	0.02 – 0.05
27	Rail cars (loaded)	0.0015 – 0.004
28	Tank tracks (hard ground)	0.04 – 0.10
29	Tank tracks (soft ground)	0.10 – 0.20

These are Ranges, Not Exact Values

Actual resistance depends on:

- Tire pressure
- Wheel diameter
- Bearing condition
- Load distribution
- Speed

Startup Force is Higher

Static resistance can be:

- 1.2 to 2× higher than rolling resistance

Always Add Safety Factor

Typical:

- Clean indoor: ×1.5
- Outdoor / uncertain: ×2
- Mud / off-road: ×2.5–3

Quick Rule of Thumb

- Smooth concrete → 0.02
- Gravel → 0.04
- Dirt → 0.06
- Sand/mud → 0.15+

9.2. PULLING FORCE CALCULATION ON HORIZONTAL APPLICATION

9.2.1. Basic Formula

$$F = W \cdot C_{rr} + W \cdot \sin(\theta) + m \cdot a + F_{extra}$$

F = required pulling force (N)
W = weight of the load (N)
C_{rr} = rolling resistance coefficient
m = mass of the load (kg)
a = acceleration (m/s²)

sin (θ) = slope angle (0° if perfectly horizontal)
F_{extra} = additional resistances (drag, friction in pulleys, etc.)

9.2.2. Basic Formula (Imperial Units)

$$F = W \cdot C_{rr} + \frac{W}{g} \cdot a$$

F = pulling force (lbf)
W = weight (lbf)
C_{rr} = rolling resistance coefficient
g = 32.2 ft/s² (gravity)
a = acceleration (ft/s²)

*In imperial, we divide by **g** to convert weight → mass.*

9.2.3. Example Calculation (Imperial)

Let's use a similar case

Load weight = **4,400 lb**
Rolling resistance = **0.02 (rubber on concrete)**
Acceleration = **0.65 ft/s²**

Step 1: Rolling Resistance Force

$F = 4400 \times 0.02 = 88$ lbf

Step 2: Acceleration Force

First convert weight to mass : $m = \frac{4400}{32.2} \approx 136.6$ slugs

Then: $F_a = 136.6 \times 0.65 \approx 88.8$ lbf

Step 3: Total Pulling Force

$F = 88 + 88.8 \approx 177$ lbf

9.2.4. Apply Safety Factor

Assume **×2 safety factor** : $F_{rated} = 177 \times 2 = 354$ lbf

So you'd select a winch rated at at least ~350–400 lbf line pull.

9.2.5. Convert to Drum Torque

If drum radius = **0.5 ft :** $T = F \times r = 354 \times 0.5 = 177$ lb-ft

9.3. PULLING FORCE CALCULATION ON HORIZONTAL APPLICATION WITH SLOPE

9.3.1. Basic Formula (Imperial Units)

$$F = W \cdot C_{rr} + W \cdot \sin(\theta) + \frac{W}{g} \cdot a$$

F = required pulling force (lbf)
W = load weight (lbf)
C_{rr} = rolling resistance coefficient
θ = slope angle (degrees)
g = 32.2 ft/s²
a = acceleration (ft/s²)

9.3.2. Understanding the Slope Term

Slope	Angle	sin(θ)
0%	0°	0.000
5%	2.9°	0.050
10%	5.7°	0.100
20%	11.3°	0.196
30%	16.7°	0.287

Rule of thumb

Grade (%) ≈ 100 × sin(θ)
(good approximation for small angles)

9.3.3. Example Calculation (Imperial)

Given:

Load = **4,400 lbf**
Rolling resistance = **0.02**
Slope = **10% (≈ 5.7°)**
Acceleration = **0.65 ft/s²**

Step 1: Rolling Resistance

F_{rr} = 4400 × 0.02 = 88 lbf

Step 2: Slope Force

$F_{slope} = 4400 \times 0.10 = 440$ lbf

Step 3: Acceleration Force

$$m = \frac{4400}{32.2} \approx 136.6 \text{ slugs}$$

$F_a = 136.6 \times 0.65 \approx 89$ lbf

Step 4: Total Pulling Force

$F = 88 + 440 + 89 = 617$ lbf

Step 5: Apply Safety Factor (×2)

$F_{rated} \approx 1230$ lbf

Slope Dominates Quickly

- At 10% grade, slope force = 10% of weight
- At 30% grade, slope force ≈ 30% of weight

That's often much larger than rolling resistance.

Downhill vs Uphill

- Uphill pulling → add $W \sin(\theta)$
- Downhill lowering → winch must hold back this same force

Conservative Shortcut

For quick estimates

$F \approx W \cdot (C_{rr} + \text{grade})$

Example

$F \approx 4400 \cdot (0.02 + 0.10) = 528$ lbf

9.4. PULLING FORCE CALCULATION ON VERTICAL APPLICATION

9.4.1. Basic Formula (Imperial Units)

$$F = W + \frac{W}{g} \cdot a$$

F = required pulling force (lbf)
W = load weight (lbf)
g = 32.2 ft/s²
a = acceleration (ft/s²)

9.4.2. Example Calculation (Imperial)

Given:

Load = **4,400 lbf**
Acceleration = **0.65 ft/s²**

Step 1: Convert to Mass

$$m = \frac{4400}{32.2} \approx 136.6 \text{ slugs}$$

Step 2: Acceleration Force

$F_a = 136.6 \times 0.65 \approx 89$ lbf

Step 3: Total Pulling Force

$F = 4400 + 89 = 4489$ lbf

Step 4: Apply Safety Factor

Typical lifting safety factors:

- General lifting : **×2–3**
- Personnel lifting : **×5+**

Using ×2 : $F_{rated} \approx 9000$ lbf

9.4.3. Critical Real-World Factors (Vertical)

Static (Breakaway) Load

- Starting lift may require **10–20% extra force**

Dynamic Effects

- Shock loads (jerks) can **double the force briefly**

Drum Layer Effect

As cable builds up:

- Effective drum radius increases
- Required torque increases
- Available line pull decreases

Mechanical Losses

Include:

- sheaves/pulleys (5–10% loss each)
- gearbox efficiency
- bearing friction

9.4.4. Convert to Drum Torque

Example (radius = 0.5 ft) : T = F × r

T = 9000 × 0.5 = 4500 lb-ft

9.4.5. Key Insight

Case	Dominant Force
Horizontal	Rolling resistance (~2–5%)
Inclined	Gravity component
Vertical	**100% of weight**

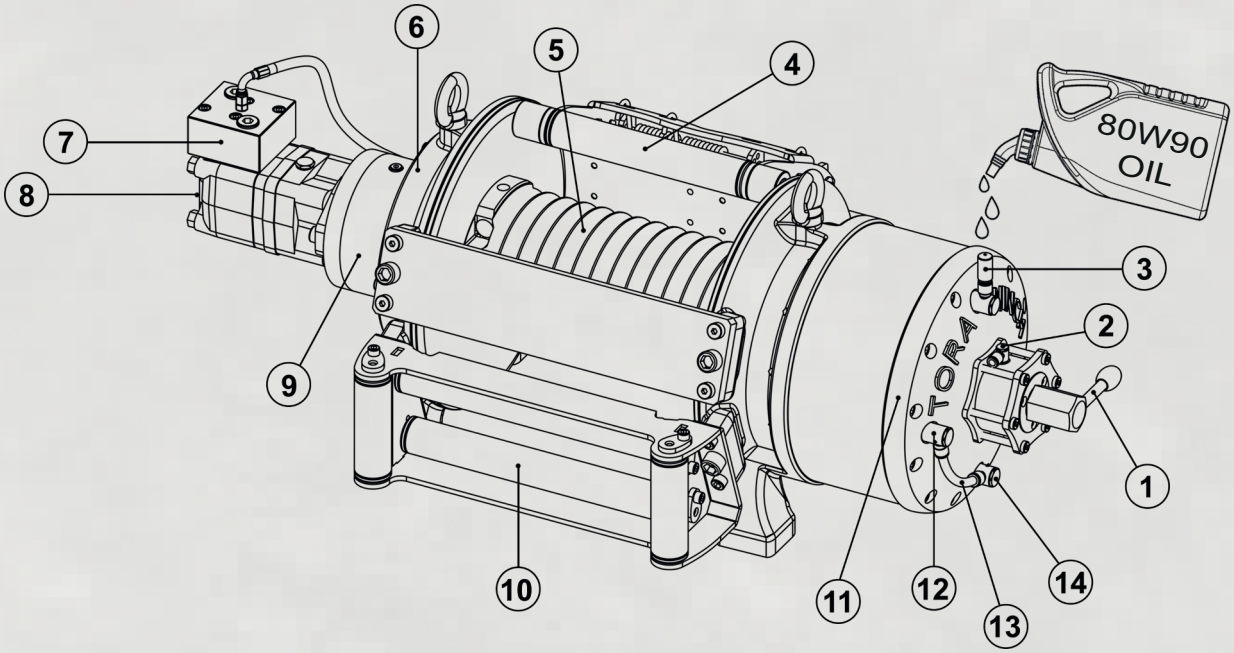
Vertical lifting is typically 10–50× more demanding than horizontal pulling.

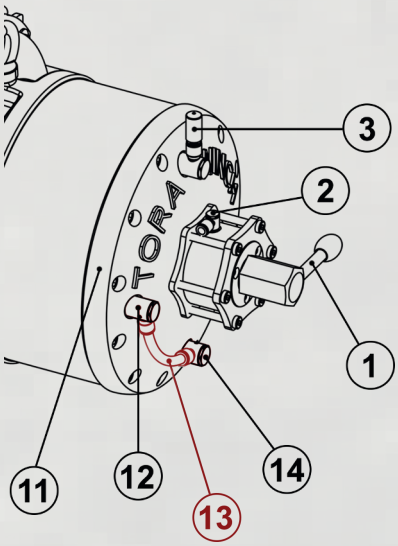
9.4.6. Bottom Line

Minimum force = load weight

Add:

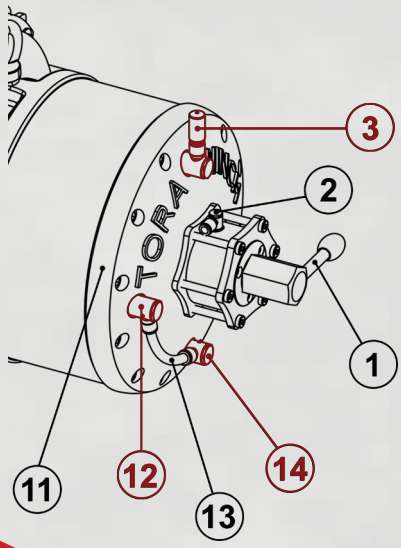
- acceleration
- friction losses
- safety factor





Monthly Checks (Recommended)

► Check oil contamination from oil hose. (13)
► Check for hydraulic oil leaks around hoses, fittings, and seals.
► Check hydraulic pressure settings and adjust if necessary.
► Inspect mounting bolts and structural components for tightness and integrity
► Verify proper operation of the control valve and brake valve.
► Inspect and, if needed, replace the steel cable.



Oil Change (Yearly)

► Drain oil from Drain Plug (14), make sure old oil is fully removed.
► Remove air breather (3) and fill aprx. 2,3 liter (77 fl-oz) SAE 80W90 oil.
► Check oil level from oil level plug (12)

11.1. WARRANTY TERMS

1. Warranty period is one (1) year from the delivery of the product.
2. In the event that the product fails during the warranty period, the following apply;
   - Failure repair time is 1 to 8 working days depending on it's nature.
   - Where the repair time lasts more than 7 working days (except transportation time), a new product shall be supplied to the customer till the failure has been repaired.
3. Where a failure occurs within the warranty period because of manufacturing fault, the product shall be repaired free of charge.

11.2. SITUATIONS WHICH TERMINATE WARRANTY OBLIGATIONS

The warranty obligations shall become null and void in following situations;

- Using the product for a purpose other than the intended use,
- Changes to the product that are not approved by us,
- Digression from defined specifications and reference limits,
- Failing to perform indicated product maintenance,
- Having a repair, carry out maintenance works or replace parts of the product service provide, other than the Authorized Service Point within the warranty period.
- Using the product against the usage terms set forth in the usage instructions,
- Where the product is damaged due to the improper mounting,
- Contact us in case of a technical failure. Removal of the winch by someone other than Authorized Technician or notified servicing point would put the equipment out of warranty coverage.

CERTIFICATE

TORA ARAÇ EKİPMAN OTOMOTİV
İÇ VE DIŞ TİCARET LİMİTED ŞİRKETİ

ŞEHİT KUBİLAY MAH. ŞEHİT BAYRAM KAVCI SK. EREN APT. NO: 2
İÇ KAPI NO: 6 KEÇİÖREN / ANKARA / TÜRKİYE

Has been assessed and found to Comply with the Requirements of:
Denetlenmiş ve aşağıdaki standardın gerekliliklerine uygunluğu görülmüştür:

ISO 14001:2015

The Environmental Management System is applicable to
Çevre Yönetim Sistemi:

DESIGN AND MANUFACTURING OF INDUSTRIAL PUMPS, HYDRAULIC EQUIPMENT, AUTOMOTIVE PARTS AND COMMERCIAL TRUCK EQUIPMENTS

ENDÜSTRİYEL POMPALAR, HİDROLİK EKİPMANLAR, OTOMOTİV PARÇALARI VE İŞ ARACI EKİPMANLARI TASARIM VE İMALATI

Certificate Number: EMS-0101106 — Initial Certification Date: 17.02.2026
Belge Numarası: EMS-0101106 — İlk Belgelendirme Tarihi: 17.02.2026

Certification Period: 3 Years — Certificate Validity Date: 16.02.2027
Belgelendirme Periyodu: 3 Yıl — Belge Geçerlilik Tarihi: 16.02.2027

IQR Sertifikasyon Onayı

IAS ACCREDITED Management Systems Certification Body MSCB-135

IQR ULUSLARARASI BELGELENDİRME HİZMETLERİ LTD.ŞTİ.
Beşevler Mah. Kocayunus Sk. No:3 Arslan Han Plaza K:2 Nilüfer / BURSA
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CERTIFICATE

TORA ARAÇ EKİPMAN OTOMOTİV
İÇ VE DIŞ TİCARET LİMİTED ŞİRKETİ

ŞEHİT KUBİLAY MAH. ŞEHİT BAYRAM KAVCI SK. EREN APT. NO: 2
İÇ KAPI NO: 6 KEÇİÖREN / ANKARA / TÜRKİYE

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Denetlenmiş ve aşağıdaki standardın gerekliliklerine uygunluğu görülmüştür:

ISO 9001:2015

The Quality Management System is applicable to:
Kalite Yönetim Sistemi:

DESIGN AND MANUFACTURING OF INDUSTRIAL PUMPS, HYDRAULIC EQUIPMENT, AUTOMOTIVE PARTS AND COMMERCIAL TRUCK EQUIPMENTS

ENDÜSTRİYEL POMPALAR, HİDROLİK EKİPMANLAR, OTOMOTİV PARÇALARI VE İŞ ARACI EKİPMANLARI TASARIM VE İMALATI

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T.C.
TÜRK PATENT ve MARKA KURUMU

MARKA TESCİL BELGESİ

Marka No : 2021 101037 - Ticaret - Hizmet

Marka Sahibi : TORA ARAÇ EKİPMAN OTOMOTİV İÇ VE DIŞ TİCARET LİMİTED ŞİRKETİ
TÜRKİYE CUMHURİYETİ
ŞEHİT KUBİLAY MAH. ŞEHİT BAYRAM KAVCI SK. EREN APT. NO: 2 İÇ KAPI NO: 6 Keçiören Ankara

Emtiası : 12 , 35
İlişiktedir.

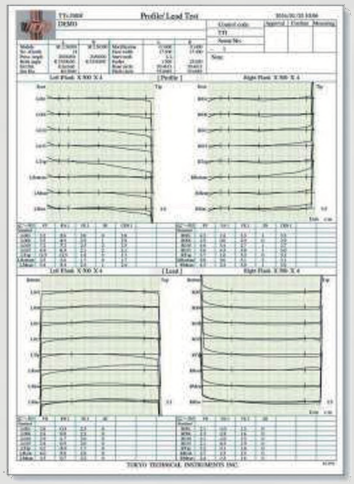
İşbu Marka 12/07/2021 tarihinden itibaren ON YIL süreyle 18/01/2022 tarihinde tescil edilmiştir.

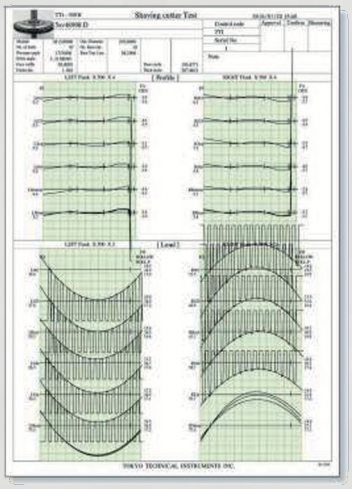
Prof. Dr. Habip ASAN
Türk Patent ve Marka Kurumu Başkanı

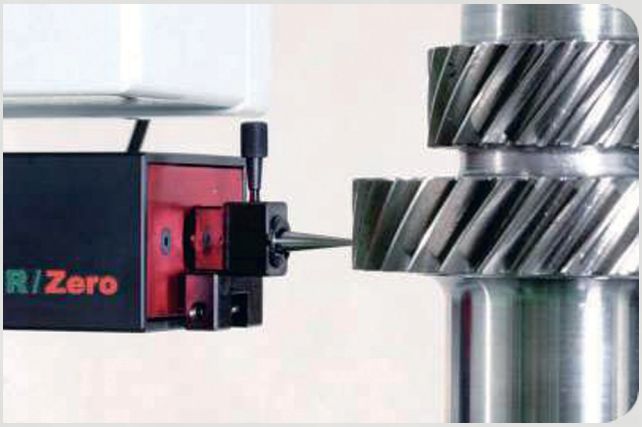
TÜRK PATENT
TÜRK PATENT VE MARKA KURUMU

ISO 14001:2015 ISO 9001:2015 EN 14492-1 SAE J706 CE

TORA Hydraulic Winch systems undergo comprehensive quality control and performance testing prior to shipment. TORA branded winches are carefully inspected for mechanical durability, rope tension balance, load handling performance, and hydraulic system stability by experienced engineers.







As part of the quality assurance process, hydraulic pressure inspections, leakage tests, drum and rope alignment checks, and structural evaluations are also performed.

All TORA hydraulic winch systems successfully pass these testing procedures before delivery, ensuring compliance with high safety and performance standards for heavy duty and industrial operations.

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