ICE®

Hydraulic Torque Wrench

Description, Operation and Safety

HYTORC

January 4, 2018

Hydraulic Torque Tool Technology

PUSH – ADVANCE – CLICK – RELEASE – Tool Drive Turns 24 degrees

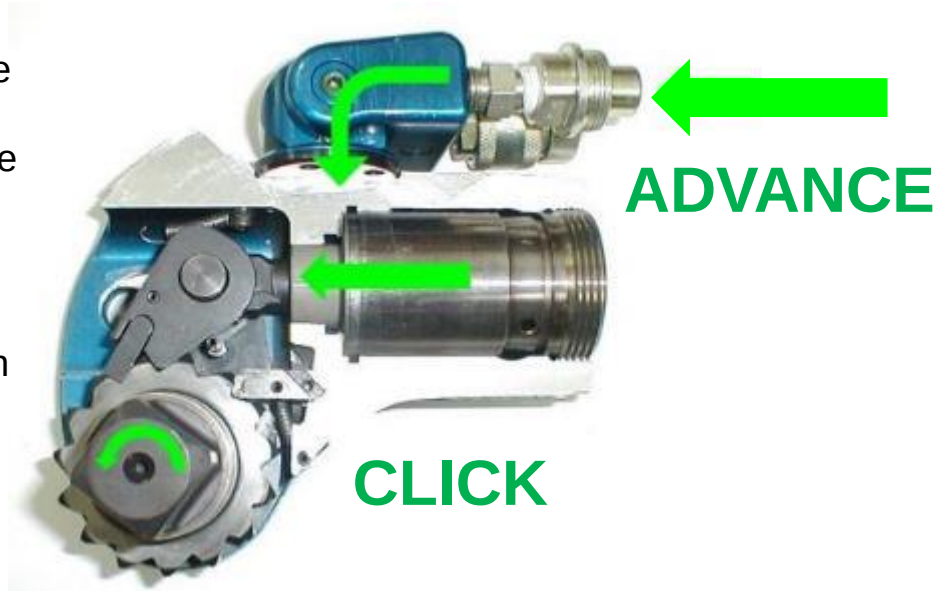
PUSH
Pushing the advance button on the remote switches a solenoid valve on the pump and directs hydraulic fluid pressure into the advance side of the tool cylinder.

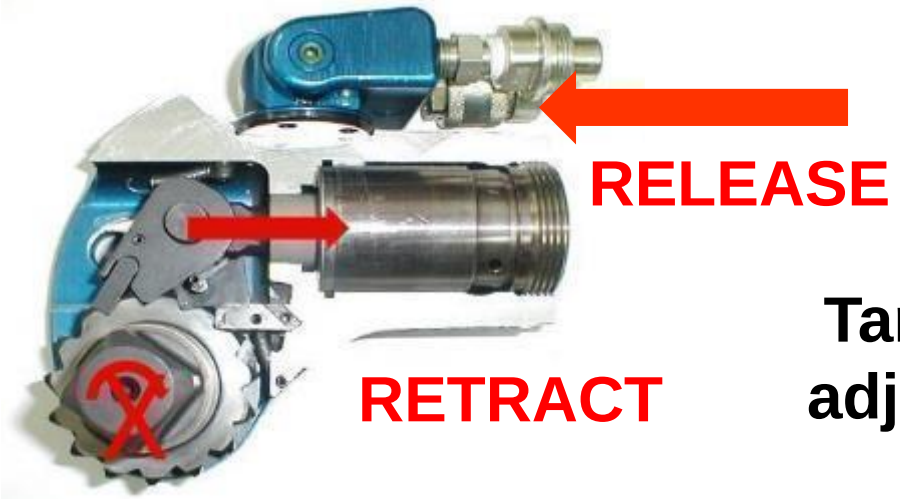
ADVANCE
Piston in the tool cylinder advances to turn the ratchet 24 degrees/click.
(some tool ratchets are different, the STEALTH turns 18 degrees/click)

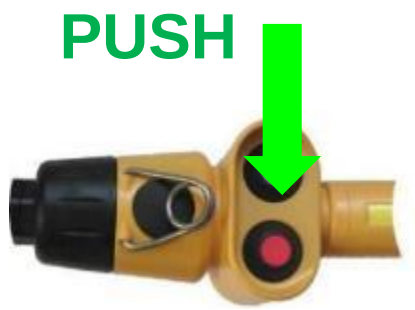
CLICK
Ratchet locks in place against a pawl with a distinct clicking sound.

RELEASE - RETRACT
Releasing the advance button causes the solenoid valve to direct pressure in the release port to retract the piston.

REPEAT
This sequence is repeated until tool stalls at the desired pressure – nut stops turning.







Target torque value is set by adjusting the pump pressure.

Hydraulic Tool Overview

CRITICAL PATH TECHNOLOGY
Safest, leak and failure-free

HEAVY INDUSTRY TECHNOLOGY
Most widely used

MAINTENANCE TECHNOLOGY
Durable and simple to maintain

Square Drive Tools

ICE
.7, 1, 3, 5

AVANTI
.7, 1, 3, 5, 8, 10, 20, 35, 50, 80, 130

MXT
.7, 1, 3, 5, 10, 15, 20, 35

EDGE
2, 4, 6, 8, 12, 30

Low Clearance Tools

STEALTH
2, 4, 14, 22, 36

XLCT
2, 4, 8, 14, 18, 30, 45

VERSA
1, 2, 4, 8, 14, 20, 30

Pumps

HY-115/230

HY-AIR

HY-VECTOR

Accessories

Hydraulic Torque Tool Comparison

	 ICE	 Avanti	 MXT	 EDGE	 Stealth	 XLCT	 Versa
Multi-direction hose swivel	✓	✓	✓	✓	✓	✓	✓
Torque accuracy within 5%	✓	✓	✓	✓	✓	✓	✓
Torque output up to 35,000 ft-lbs		✓	✓	✓	✓	✓	✓
Torque output beyond 35,000 ft-lbs		✓				✓	
Lock-on release	✓	✓	✓		✓	✓	
Hands-free bolting	✓*	✓*			✓		
Industry leading safety	✓*	✓*			✓*		
Industry leading load accuracy	✓*	✓*			✓*		
Auto pressure release	✓						
Total freedom swivel	✓						

ICE Features

ICE is the worlds first auto-lock-release hydraulic square drive tool.
Offers flexibility for use with HYTORC Washer & Nut.

Total-Freedom Uniswivel Coupler

Provides the worlds only **180-360-360** adjustable coupler, allowing complete freedom in arranging hoses .

Multiple Drive Configurations

The ICE is supplied with a standard push-button and adjustable reaction arm for conventional torque applications. The ICE tool can also be configured with a driver for the HYTORC washer and a tensioning driver for use with the HYTORC Nut.

Auto-Release - No Lock-Up

The ICE automatically releases pressure after bolting for quick and easy movement from nut to nut and increased operator safety.

Conventional Torque

HYTORC Washer

Reversible Square Drive

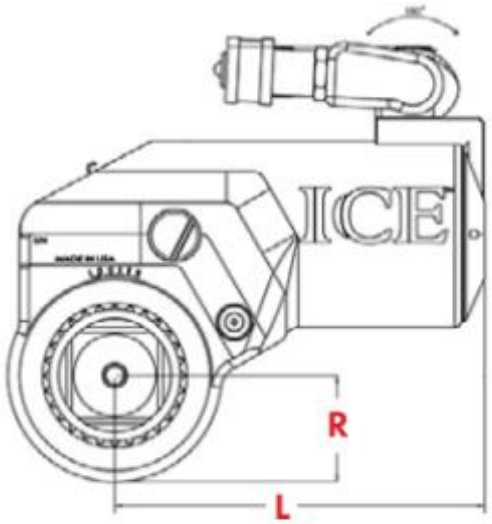
Entire drive is removed with the push of a button and reversible allowing rapid change between tighten and loosen modes**.**

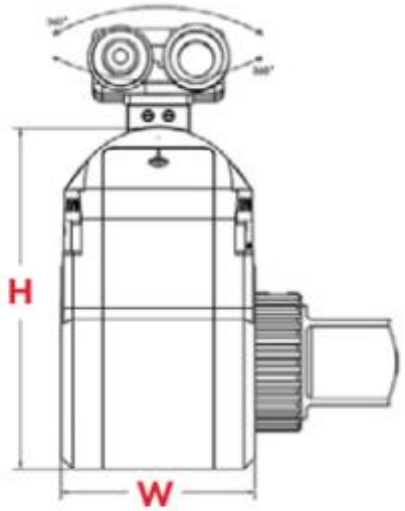
Concentric Reaction Spline

Reaction arm is fastened to the reaction spline concentric with the square drive, providing less stress in the tool body, less side load and more uniform application of torque.

HYTORC Nut

ICE Specifications





MODEL NUMBER	H	W	L	R	DRIVE	WEIGHT	TORQUE	
	IMPERIAL (in.)					lbs.	MIN (ft.-lbs.)	MAX (ft.-lbs.)
ICE - .7	4.60	1.85	3.75	25	3/4	4.55	117.00	806
ICE - 1	5.17	2.18	4.43	1.13	3/4	6	196	1,284
ICE - 3	6.58	2.90	5.53	1.52	1	10	460	3,084
ICE - 5	7.63	3.38	6.44	1.80	1-1/2	18	804	5,360
	METRIC (mm)					kg	MIN (Nm)	MAX (Nm)
ICE - .7	116.90	47.0	95.30	.99	19.05	2.06	158.00	1,092.00
ICE - 1	131.32	55.40	112.50	28.70	19.05	2.72	265.74	1,740.90
ICE - 3	167.13	73.70	140.50	38.60	25.40	4.53	623.70	4,148.34
ICE - 5	193.80	85.90	163.60	45.72	38.10	8.16	1,090.10	7,267.20

H - Hydraulic Torque Tool Procedures

The following operating procedures should be followed to set-up and operate hydraulic torque tools.

- ❑ H1 Inspect Tool
- ❑ H2 Install Reaction Arm
- ❑ H3 Install Socket or Link
- ❑ H4 Install Handles
- ❑ H5 Set-Up Pump
- ❑ H6 Connect Hoses
- ❑ H7 Select Pump Pressure
- ❑ H8 Adjust Pump to Set Torque
- ❑ H9 Position the Tool
- ❑ H10 Tighten Bolt
- ❑ H11 Release Locked-On Tool
- ❑ H12 Loosen Bolt

Inspect Tool

H1 Inspect the Tool before Use

- ❑ Check couplers for damage, ensure they are free of debris
- ❑ Female coupler has O-ring seated
- ❑ Inspect swivels for cracks and damage
- ❑ Make sure the swivel retaining ring is attached
- ❑ Check the reaction arm for cracks or damage
- ❑ Make sure reaction arm is properly attached to tool
- ❑ Inspect the housing for cracks/damage
- ❑ Inspect reaction spline for damage
- ❑ Inspect square derive/linkage for cracks or damage
- ❑ Inspect levers for damage

Install Reaction Arm

When using conventional torque with sockets and reaction arms or arm extensions, attach the reaction arm and firmly challenge that the arm is attached to the tool.

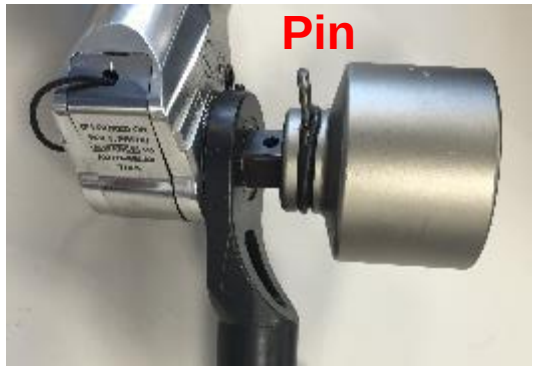
H2 Install Reaction Arm

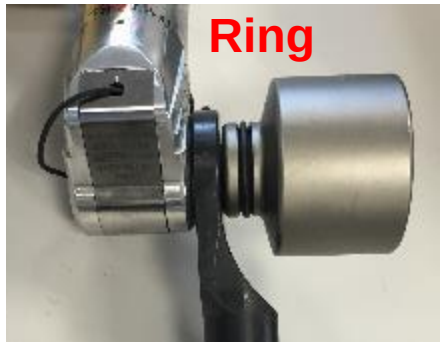
- ❑ Slide the reaction arm over the drive spline while aligning the Allen Set Screw with the flat on the Reaction Spline.
- ❑ Tighten Allen Set Screw to firmly attach the reaction arm to the spline.
- ❑ Challenge the reaction arm to make sure it is firmly secured onto the tool.

Caution: Never modify a reaction arm! Changes in the reaction arm may lead to personal injury or damage to the tool.

Install Socket or Link

When using conventional torque with sockets or links secure them to the tool.





H3 Install Socket (Square Drive Tools)

- ❑ Always Use Premium Impact Grade Sockets
- ❑ Always Use the Strongest Socket for the Job
- ❑ Always Use the Correct Size Socket
- ❑ Take Care with Socket Extensions and Adapters
- ❑ Never Use a Cut-Down or Modified Socket
- ❑ Inspect Every Socket Before Use
- ❑ Slide the socket over the drive and push the Pin through the Socket and the Drive
- ❑ Hold Pin in place with a Ring or approved retainer

Install Handles

Always install tool handles if available to ensure maximum safety in handling tools.

H4 Install the Handle

- Simply thread the handle into the tool with the twist knob on top until firmly attached.
- Note the tool handle may be easily rotated once the tool is positioned

Set-Up Pump

Use the following procedure to set up, inspect and check standard manual pumps before use.
See more detailed instructions for setting up and operating automated pumps.

H5 Inspect and Setup Pump

- ❑ Check power and remote cords for damage
- ❑ Check remote control assembly for damage
- ❑ Fans are free of debris
- ❑ Check oil – fill if to middle of upper site glass
  (If oil is dark may be time to replace oil)
- ❑ Verify the Following Power Requirements
  - ❑ Voltage and frequency supply match the information on the pump plate. (e.g. 120VAC, 60 HZ, 20A Service)
  - ❑ AC plug matches voltage/service outlet.
  - ❑ Power cable is not damaged.
  - ❑ Connected to grounded electrical outlet.
  - ❑ Extension cord of equal or greater size to pump cord.
  - ❑ **Extension cord 12AWG or larger and 50-feet max.**
- ❑ Plug-in the Power Cord

Air Powered Pump (optional)

- ❑ Verify air supply is 100 psi

Run the Pump

- ❑ Turn pump on (green button on remote)
- ❑ LED lights should be green
- ❑ Check the pressure builds to 10,000 psi in advance, 1,500 psi in retract
- ❑ Check for leaks
- ❑ Check gauge for damage
- ❑ Turn pump off
- ❑ Couplers are clean and free of debris

Fill Oil
To middle of upper site glass

Check Pressure
CW increase, CCW decrease

Connect Hoses

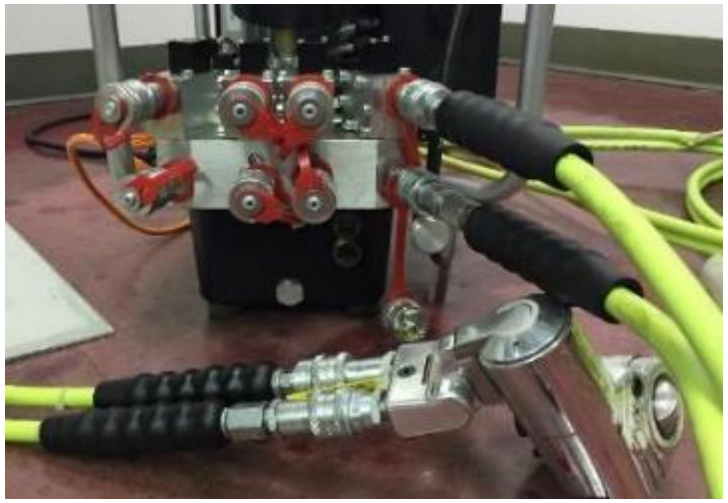
HYTORC Hydraulic bolting tools are connected with the same threaded male-female connectors.

H6 Connect Hoses

- ❑ Inspect Hoses –there are no cuts or worn spots
- ❑ Inspect High-Pressure Strain Relief – ensure they cover hose with no gaps
- ❑ Couplings are clean and free of debris
- ❑ Inspect Ball Joints – lightly press ball to test if oil comes out
- ❑ Make sure O-rings are seated in female couplings
- ❑ Connect Hoses to Pump & Tool
  - Male to female
  - Female to male
  - Should only require finger tight
  - Never use a wrench on couplings
- ❑ Turn on Pump, check all connections for leaks

Male

Female



Blast Caps (strain relief)

To extend hose length an odd number of hoses must be used or order a longer hose, to make sure the connector gender is maintained.

Select Pump Pressure

Each Hydraulic Tool Torque output is calibrated over a range of hydraulic pressures and has it's own torque conversion chart. To achieve a target torque select pressure from the table provided with each tool.

H7 Select Pump Pressure

- ❑ Given a target torque (e.g. 750 ft-lbs)
- ❑ Read from the chart, required pump pressure(e.g. 4,000 psi).

HYTORC

TOOL MODEL: HY-STEALTH 2 with HEX LINK

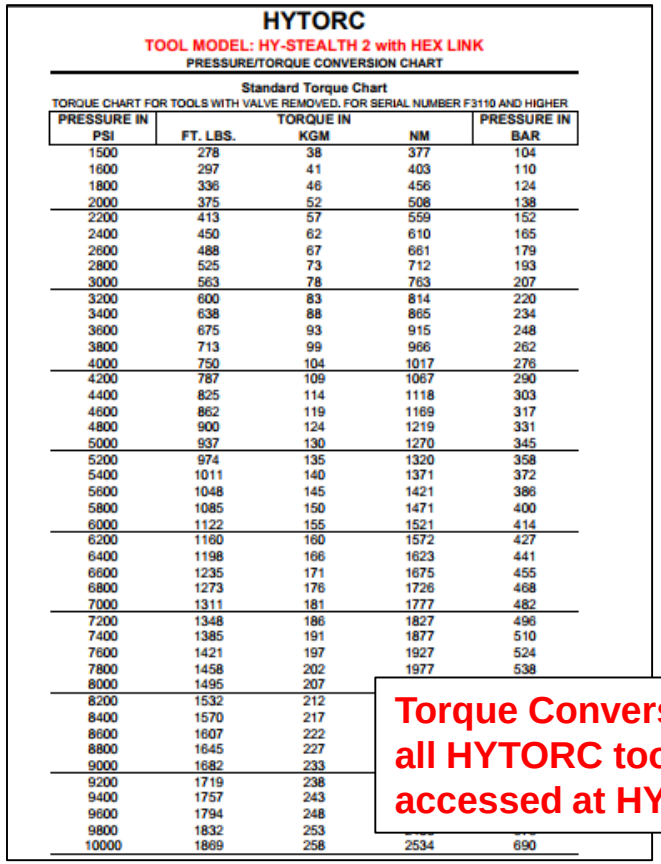
PRESSURE/TORQUE CONVERSION CHART

Standard Torque Chart

TORQUE CHART FOR TOOLS WITH VALVE REMOVED. FOR SERIAL NUMBER F3110 AND HIGHER

PRESSURE IN	TORQUE IN			PRESSURE IN
PSI	FT. LBS.	KGM	NM	BAR
1500	278	38	377	104
1600	297	41	403	110
1800	336	46	456	124
2000	375	52	508	138
2200	413	57	559	152
2400	450	62	610	165
2600	488	67	661	179
2800	525	73	712	193
3000	563	78	763	207
3200	600	83	814	220
3400	638	88	865	234
3600	675	93	915	248
4000	750	104	1017	276
4400	825	114	1118	303
4600	862	119	1169	317
4800	900	124	1219	331
5000	937	130	1270	345

Torque Conversion Chart for STEALTH-2
Tool calibrated from 1,500 psi (278 ft-lbs)
to 10,000 psi (1,869 ft-lbs)



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3400	638	88	865	234
3600	675	93	915	248
3800	713	99	966	262
4000	750	104	1017	276
4200	787	109	1067	290
4400	825	114	1118	303
4600	862	119	1169	317
4800	900	124	1219	331
5000	937	130	1270	345
5200	974	135	1320	358
5400	1011	140	1371	372
5600	1048	145	1421	386
5800	1085	150	1471	400
6000	1122	155	1521	414
6200	1160	160	1572	427
6400	1198	166	1623	441
6600	1235	171	1675	455
6800	1273	176	1726	468
7000	1311	181	1777	482
7200	1348	186	1827	496
7400	1385	191	1877	510
7600	1421	197	1927	524
7800	1458	202	1977	538
8000	1495	207		
8200	1532	212		
8400	1570	217		
8600	1607	222		
8800	1645	227		
9000	1682	233		
9200	1719	238		
9400	1757	243		
9600	1794	248		
9800	1832	253		
10000	1869	258	2534	690

Torque Conversion Charts for all HYTORC tools are easily accessed at HYTORC.com

Adjust Pump to Set Torque

H8 Adjust Pump Pressure to Set Torque

- ❑ Loosen the knurled locking ring below the “T” handle on the pump’s external pressure regulator. Then turn the “T” handle counterclockwise (CCW) until it turns freely and easily.
- ❑ Turn the pump “on”. Using the pump’s remote control, push down the advance switch (or button on air pumps) and hold it.
- ❑ While holding the pump in the advance mode, slowly turn the “T” handle clockwise and observe the pump pressure gauge rise. NOTE: Always adjust the regulator pressure up - never down.
- ❑ When your gauge reaches the desired PSI, stop turning the “T” handle and let the gauge settle out.
- ❑ If the pressure continues to rise release the advance button and back off your pressure slightly - by turning CCW on the “T” handle. Then re-depress the advance switch on your remote and slowly bring pressure up to the desired level again.
- ❑ When the pressure is correct, turn the pump “off’ and tighten the knurled lock nut provided under the “T” handle. This sets pump pressure, which determines torque tool output.
- ❑ Once your target pressure is set and locked, cycle the pump once more to ensure that your pressure setting did not change as you turned down the knurled knob.

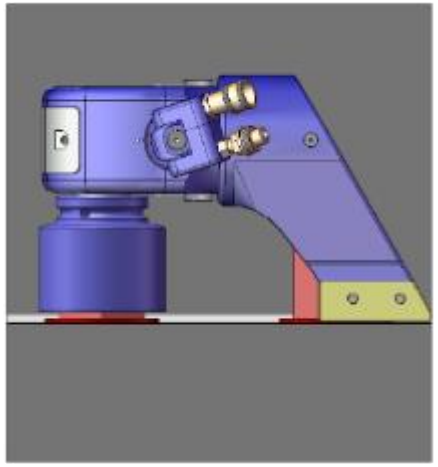
NOTE: Always adjust the regulator pressure up - CW - never down.

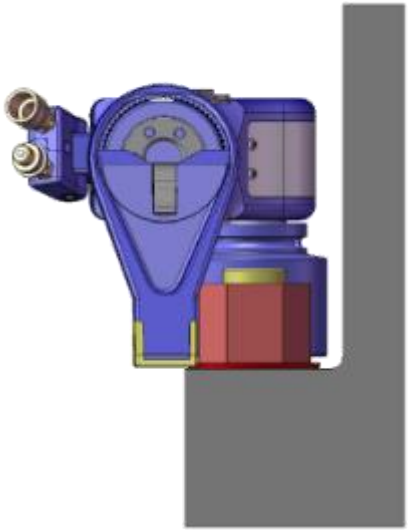
Position the Tool

H9 Position Tool and Reaction Arm

- ❑ Make sure the tool is setup appropriately for tighten or loosen.
- ❑ Place the tool socket/link on the nut, making sure that the socket/link has fully engaged the nut.
- ❑ Make sure the reaction arm is firmly abutted against a stationary object (e.g. an adjacent nut, flange, equipment housing etc.)
- ❑ Make sure that the hose connections are well clear of any obstructions, and that all parts are safely out of harm's way.
- ❑ If needed, install back wrench or apply back wrench fixture.
- ❑ THEN, AND ONLY THEN, apply momentary pressure to the system to ensure proper tool placement. If it doesn't look or act right, stop and re-adjust the reaction arm.

Make sure the reaction arm is firmly abutted against a stationary object





Tighten Bolt

H10 Tighten Bolt

- ❑ Push remote advance button, ear of the tool will push back until reaction arm makes contact with reaction surface.
- ❑ Continue to hold advance button as the socket turns until you hear an audible “click” which will signify the tool piston is fully extended and the socket will not turn further.

  IMPORTANT: The reading of full preset pressure on the pump after the piston is extended DOES NOT indicate that this pressure (torque) is applied to the bolt. It only indicates that the cylinder is fully extended and cannot turn the socket further until the tool automatically resets itself.
- ❑ Release advance button to retract the tool piston - tool will automatically reset itself and the operator will hear an audible “click” indicating completion of the reset.
- ❑ Continue successive cycles of “PUSH-ADVANCE-CLICK-RELEASE” until the tool “stalls” at the pre-set Torque/PSI – and the nut will no longer visibly turn.
- ❑ ALWAYS ATTEMPT ONE FINAL CYCLE TO INSURE THE “STALL” POINT HAS BEEN REACHED.

Tool Should Read “Tighten”

Release Locked-On Tools

Hydraulic tools continue to apply pressure after torque is complete which may lock the tool on to the application. Tools have release buttons/levers to release the pressure to all to tool to be released.

H11 Release Locked-On Tool

- ❑ With the pump turned-off, slide the release lever/button to the retract position (B).
- ❑ Turn the pump back on and while maintaining pressure, cycle the tool by pushing the button on the remote control.
- ❑ Once you can hold the lever/button without resistance, continue holding the button and release the advance button.
- ❑ Shut-off the pump
- ❑ Remove the tool from the nut.
- ❑ Move the release lever back to position A.

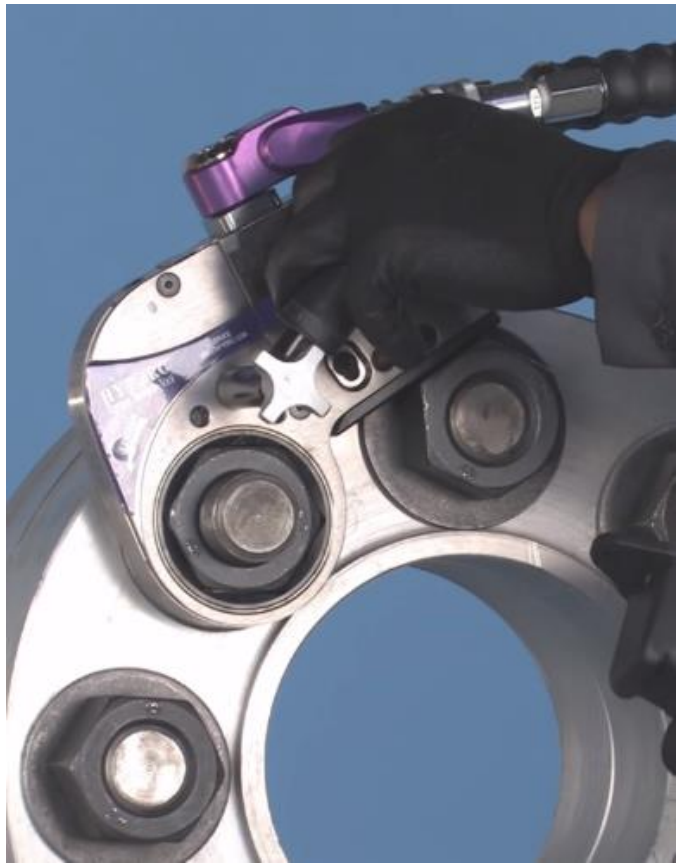
The ICE Tool has an automated release feature, generally will not need manual release.

Loosen Bolt

H12 Loosen Bolt

- ❑ Set the pump to 10,000 psi
- ❑ Change tool drive direction to the loosening mode – side labeled “Loosen” should be visible.
- ❑ Position the tool over the nut and assure the reaction arm abuts squarely against a firm reaction point.
- ❑ Press and hold the remote control button down.
- ❑ Pressure will decrease as the socket begins to turn
- ❑ As the piston completes the stroke, you will hear an audible click.
- ❑ Release the remote control button and the piston automatically retracts, again you will hear a click.
- ❑ Repeat the process until the fastener can be removed by hand.
- ❑ NOTE: If the bolt does not release it is an indication that you require a larger tool.

Tool Should Read “Loosen”



Let’s Bolt!

HYTORC®
Since 1968