

TITAN TOOL

LANCER® SERIES MICRO-MATIC STUD DRIVER

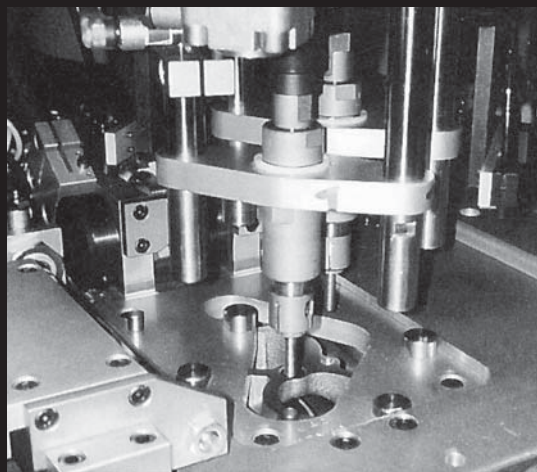
1. Quick releasing - non-reversing.
2. Cartridge design for fast, easy maintenance procedures.
3. Automatic stud projection.
4. Micro design for close clearance areas.

Excellent results on:

- Power hand tools
- Single or multiple spindle units
- Semi or fully automatic assembly machines

Features:

- AUTO-LOAD® Gage
- POSI-LOAD® Stud Retainer
- Machine Load Stud Retainer
- Centering Guide



TITAN LANCER® -1 Drivers with Machine Load Stud Retainers. Stud projection height controlled by spindle stops.

TITAN®



Lancer® Series Micro-matic Stud Driver

Lancer-1



With
Centering Guide

With #10-AL
Auto-Load Gage

Lancer-2



With Posi-Load
Stud Retainer

With ML "Machine
Load" Stud Retainer

The Titan® Lancer® Series

The **TITAN LANCER SERIES** is the culmination of new design concepts resulting in several performance advantages:

1. Smaller, lighter design.
2. Increased durability.
3. Cartridge design for easy maintenance.

Projection Height Applications

If the stud is not driven to the bottom of the tapped hole, and threads are still visible above the surface of the workpiece, you are working with a projection height application. Please see pages 4 & 6 for further details.

(Stud shown completely driven to required height.)



Torque Applications

If the stud is driven to the bottom of the hole, or until the shoulder is flush with the workpiece, you are working with a torque application. Please see page 5 for further details.

(Studs shown driven to torque.)



Cartridge Design for Easy Maintenance

The **TITAN LANCER** incorporates a unique cartridge design. By simply unscrewing the LANCER's Assembly Cap, all internal parts may be literally poured out onto the workbench. This eliminates time consuming and costly repairs, as well as the need to keep expensive quantities of replacement tools on hand. All parts are made of special alloy steel, heat treated to optimum levels and are independently replaceable.

Power Source

With the exception of impact and impulse drive tools, all other power tools are acceptable as long as you stay within the recommended RPM range and torque limits listed here:

RPM AND TORQUE CHART

Lancer-1	Lancer-2
MAXIMUM TORQUE LIMIT	
12 Foot lbs. 16.3 NM 1.7 KgM	35 Foot lbs 47 NM 4.8 KgM
RPM	
MIN / MAX	MIN / MAX
500 / 1500	300 / 1000

Lancer® Series Performance Options



Centering Guide

- Use when studs are pre-started into workpiece
- Requires torque control in stud driver* or torque controlled power tool



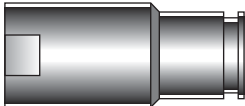
Posi-Load Stud Retainer

- For semi-automatic (hand loading) of stud into stud driver
- Requires torque control in stud driver* or torque controlled power tool
- May also be used for machine loading of stud (*Ex. - shuttle plate*)



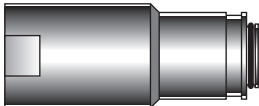
ML Machine Load Stud Retainer

- For fully automatic pre-loading of stud into stud driver
- Requires torque control in stud driver* or torque controlled power tool
- **NOT** recommended for hand loading



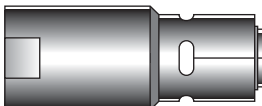
#10 Gage

- For adjustable stud projection height
- Trips tool into “non-drive, free wheeling” mode when face of gage touches workpiece
- Not recommended when driving studs to shoulder or bottoming studs in hole
- Studs must be pre-started into workpiece



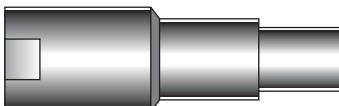
#10 AL Auto-Load Gage

- For semi-automatic (hand loading) of stud into stud driver
- Trips tool into “non-drive, free wheeling” mode when face of gage touches workpiece
- May also be used as stud retention device on torque controlled application with **longer** studs (If so, gage **MUST NOT** touch workpiece before required torque is reached.)



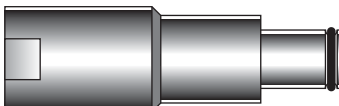
#10 ML Machine Load Gage

- For fully automatic pre-loading of **longer** studs into stud driver. (*Ex. Picking studs up from shuttle plate with ML gage provides superior concentricity of stud as workpiece is approached.*) *Not recommended for semi-automatic use (pre-loading by hand).*
- May be used as trip gage for automatic projection OR used only as stud retention device on torque controlled application if stud length permits



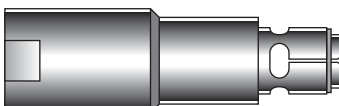
#11 thru #15 Gages

- Use same as #10 Gage, but for increasingly longer stud projection requirements



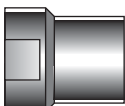
#11 AL thru #15 AL Gage

- Use same as #10 AL Gage, but for increasingly longer stud projections
- SPECIAL TO ORDER -



#11 thru #15 ML Gage

- Use same as #10 ML Gage, but for increasingly longer stud projections
- SPECIAL TO ORDER -

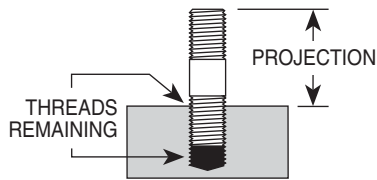


#1 Open Gage

- Use same as #10 Gage on studs with extremely short projection heights
- CAUTION: O.D. of workpiece must be greater than $\frac{25}{32}$ " (19.8 mm) when used on **Lancer-1** or greater than $1\frac{7}{32}$ " (30.95 mm) when used on **Lancer-2**.

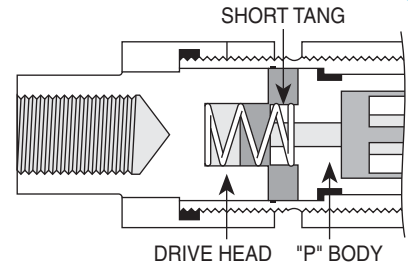
* TITAN **SENTINEL** has an adjustable torque clutch. **LANCER** does **NOT**.

Driving Studs to Projection Height



"P" Body with Short Tang

Use "P" Body when Projection Height is
 A. Controlled by stud driver.
 B. Controlled by spindle stop. (If spindle rotation continues after further axial travel is prevented by spindle stop.)



The LANCER stud driver can be used in two different ways to drive a stud to projection height:

1. Height Controlled by Gage on Stud Driver

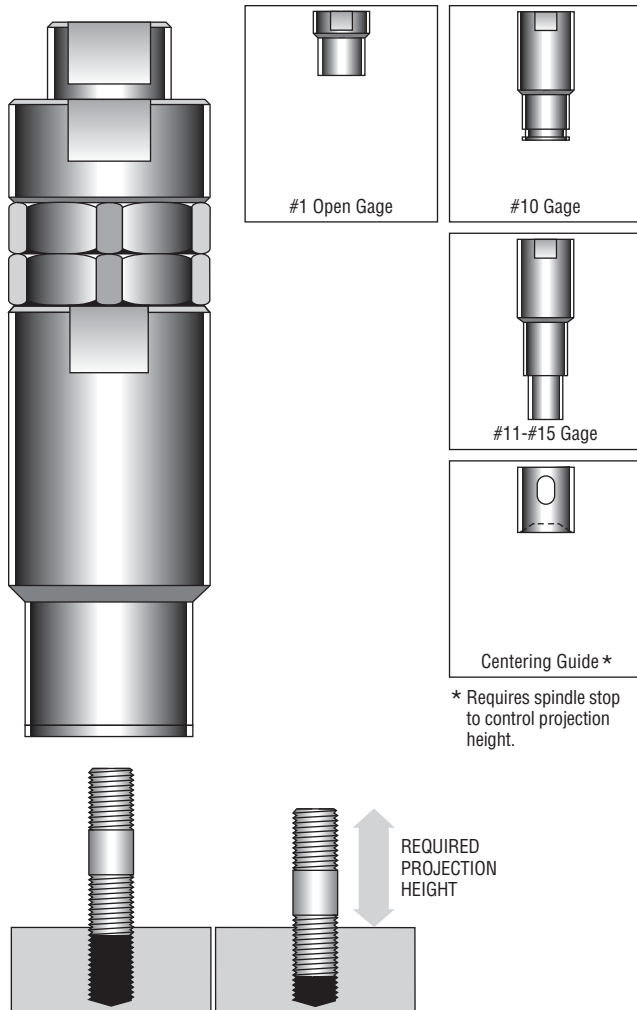
The first method is to equip the stud driver with a trip gage that makes contact with the work piece and limits the axial travel of the stud driver. Trip gages come in a variety of styles and sizes. The smallest and simplest of these gages is a #1 open gage. This gage is used to obtain extremely short projection heights. The standard gage for a Lancer is a #10 gage. This gage is very versatile and can be adjusted to deliver a wide variety of projection heights. For longer projection heights TITAN produces #11- #15 gages.

2. Height Controlled by Spindle Stop

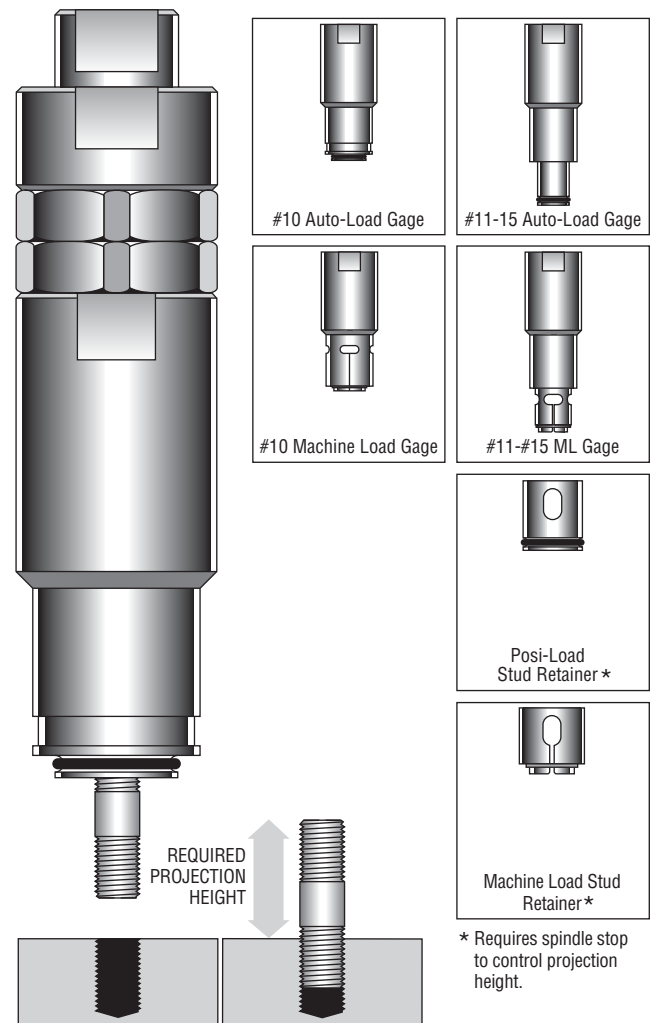
The second method is referred to as spindle stop. In a spindle stop application the projection height of the stud is controlled by limiting the axial travel of the drive spindle.

In a spindle stop application the stud driver can be used without a gage. If a gage is used as a guide or holding device for pre-loading the stud into the driver, it should not be allowed to touch the workpiece.

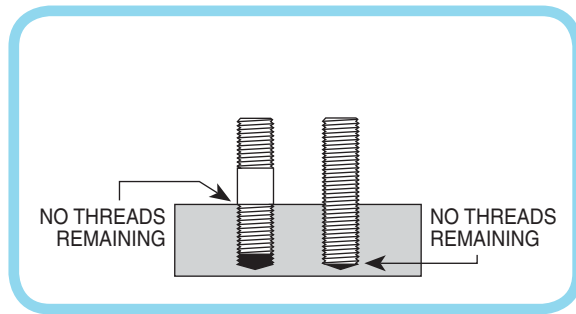
Performance Options for Hand-Starting stud:



Performance Options for Pre-Loading stud:



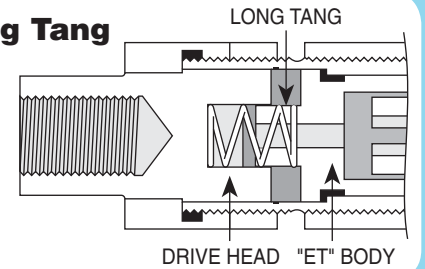
Driving Studs to Torque



"ET" BODY with Long Tang

Use "ET" Body for:

- A. Torque applications.
- B. Projection height applications which are controlled by spindle stops. (**Spindle rotation must stop at same moment that axial travel stops.**)



If a LANCER is used on a torque application, the power source must have a torque control feature.

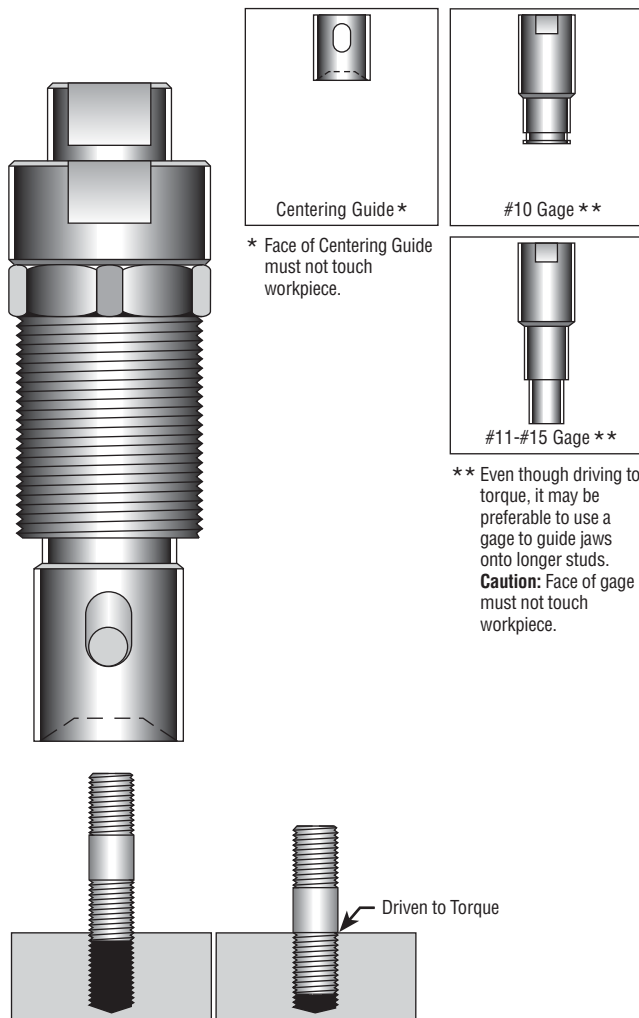
Even though the LANCER was originally designed for use on projection height applications, when properly equipped, the LANCER has proven itself to be an effective method for driving studs to a torque requirement.

Unlike the Sentinel series of stud drivers, the LANCER does not include a clutch mechanism to control the driving torque of the studs. Torque control must be achieved by one of the following methods:

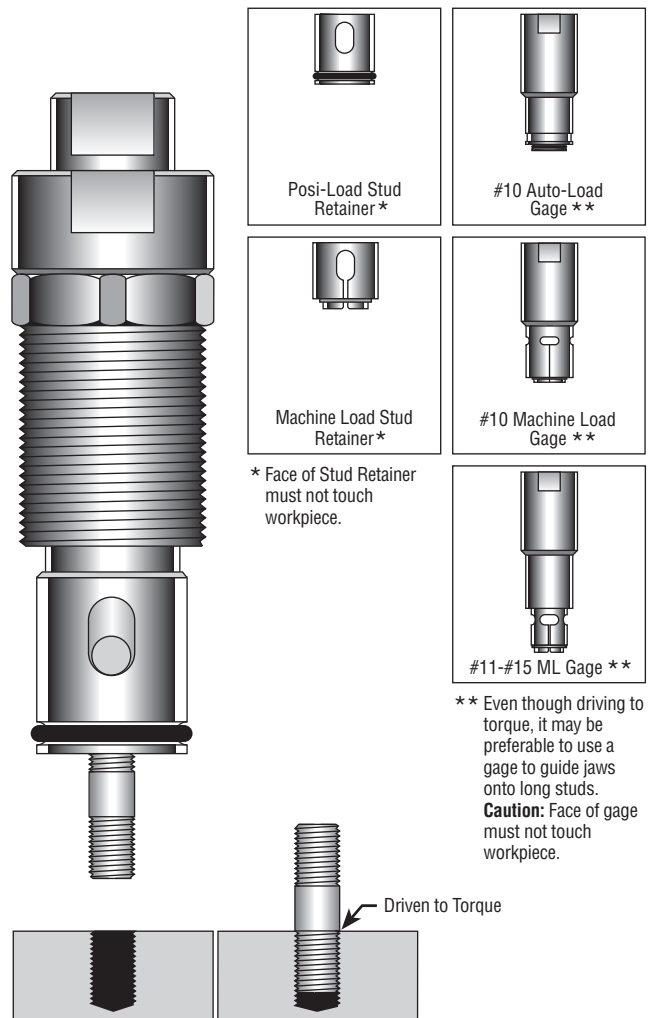
- Controlling the stall torque of the power tool.
- Electronically monitoring and controlling the torque.
- Mechanically interrupting the power source at the desired level.

When used on a torque controlled application care should be taken to insure that all rotational force is eliminated before the LANCER is removed from the stud. Failure to do this could result in damage to the stud or stud driver. This could also cause the jaws to lock onto the threads of the stud thus preventing easy removal of the LANCER at the end of the drive cycle.

Performance Options for Hand-Starting stud:



Performance Options for Pre-Loading stud:



All features shown above may be used when driving to torque, **as long as end of tool does not touch workpiece.**

Projection Height Range

		LANCER-1 ONLY		LANCER-1 AND LANCER-2				LANCER-2 ONLY		TRIP GAGE
STUD SIZE		#8, #10, M4, M5		1/4", M6, M7		5/16", M8		3/8", 7/16", M10		
		Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	
STUD PROJECTIONS	MIN.	.313"	7.9mm	.406"	10.3mm	.500"	12.7 mm	.500"	12.7 mm	#1 Open Gage
	MAX.	.470	11.9mm	.525	13.3mm	.750	19.0mm	.625	15.9mm	
	MIN.	.406	10.3mm	.500	12.7 mm	.594	15.1 mm	.594	15.1 mm	#10 Gage
	MAX.	1.625	41.2mm	1.719	43.6mm	1.813	46.0mm	1.813	46.0mm	
	MIN.	.556	14.1 mm	.650	16.5mm	.744	18.9mm	.744	18.9mm	#10-AL Auto-Load Gage
	MAX.	1.775	45.1 mm	1.869	47.4 mm	1.963	49.8mm	1.963	49.8mm	
	MIN.	.811	20.6 mm	.905	23.0 mm	1.00	25.4 mm			Lancer-1 #10-ML Machine Load Gage
	MAX.	2.027	51.5 mm	2.122	53.9 mm	2.216	56.3 mm			
	MIN.			.822	20.9 mm	.916	23.3 mm	.916	23.3 mm	Lancer-2 #10-ML Machine Load Gage
	MAX.			2.041	51.8 mm	2.135	54.2 mm	2.135	54.2 mm	
	MIN.	1.563	39.7 mm	1.656	42.0 mm	1.750	44.4 mm	1.750	44.4 mm	#11 Gage #11-AL Gage #11-ML Gage
	MAX.	2.781	70.6 mm	2.875	73.0 mm	2.969	75.4 mm	2.969	75.4 mm	

NOTE: ±.031" or ±0.8mm tolerance on all projection heights.

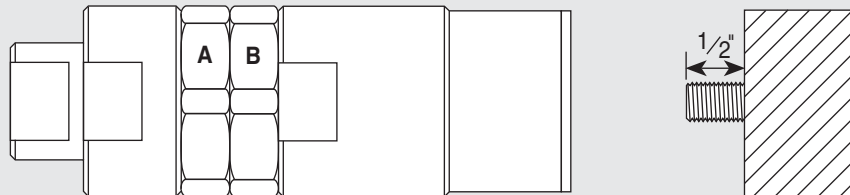
If stud projection requirements are longer or shorter than those shown above, consult TITAN TOOL COMPANY for special options or tool modifications.

Projection Height Adjustment

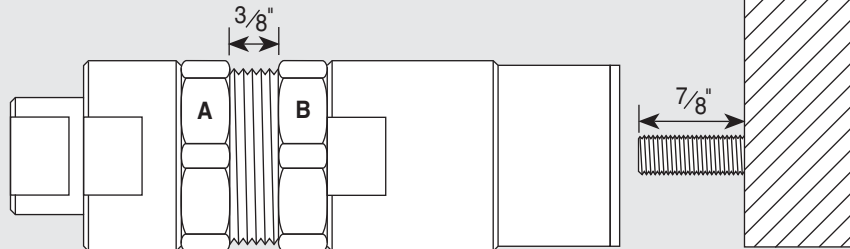
Tools shown are LANCER-1's equipped with 1/4" Jaws and #10 Gage.

Increasing the distance between lock rings "A" and "B" will produce a corresponding increase in the set projection height.

LANCER-1 set for minimum projection height of 1/2".



LANCER-1 length increased by 3/8" resulting in 7/8" stud projection height.

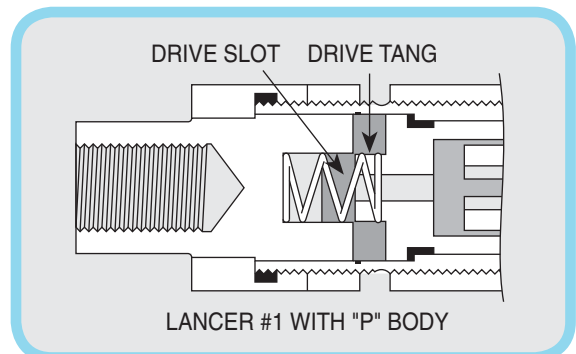


Two Stage, Anti-Strip Loading/Unloading Cycles

Whenever the LANCER is used on a projection height application it is essential that you specify that the tool be equipped with a "P" Body. The "P" Body allows the Drive tang and slot to completely disengage. This totally isolates the body, jaws and stud from any rotational force.

This unique two stage loading/unloading cycle prevents thread damage that commonly occurs with projection height stud drivers that utilize a conventional single stage design.

Exception: If projection height of stud is controlled by Spindle Stop, and Spindle Rotation stops at the same time as Spindle Feed stops, then use ET-Body for improved performance.



TTSL Spring Loaded Spindle Adaptor

1. Absorbs excess spindle travel while maintaining axial pressure between spindle and drive tool.
2. Allows axial float without sacrificing concentricity.
3. Adapts easily to all types of spindles.

NOTE:

1. At no time during the drive cycle should the TTSL spring be completely compressed.
2. The TTSL spring should **not** be used to continue the advancement of the stud drivers after the spindle drive mechanism has been halted.

SPINDLE ADVANCEMENT FORMULA

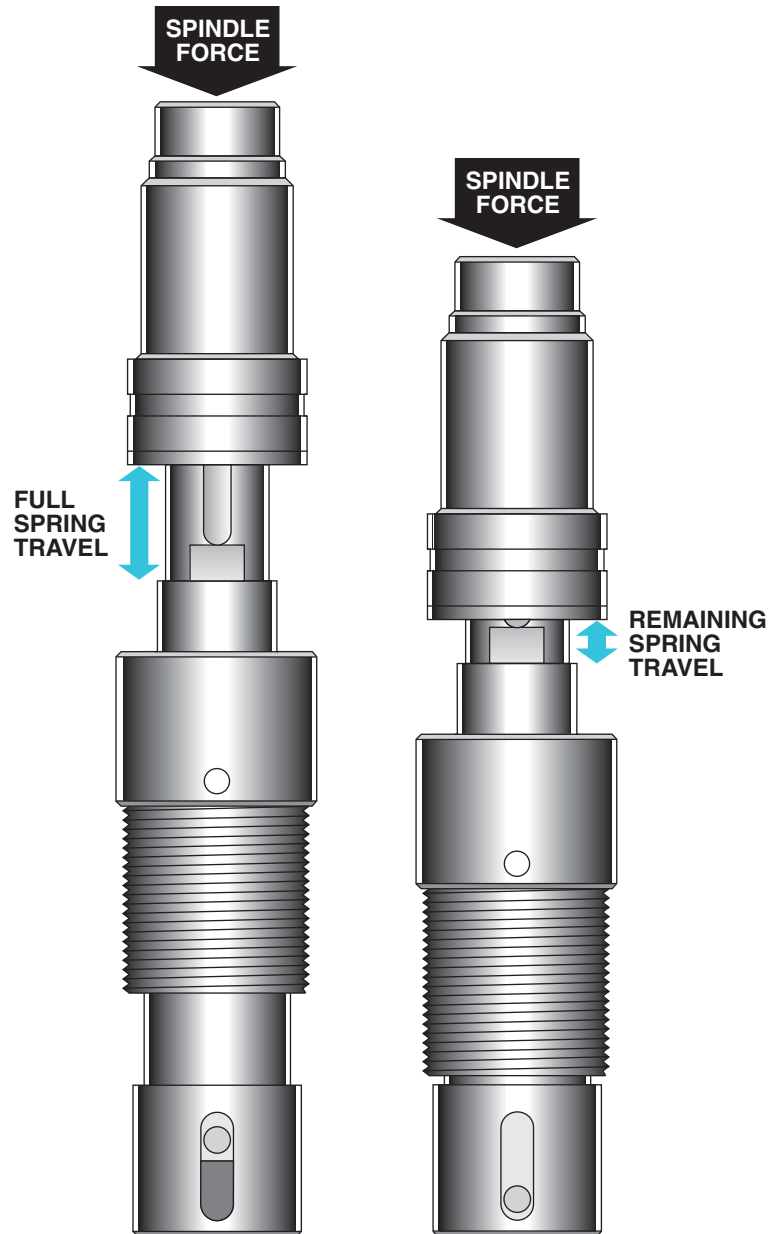
For proper Spindle Feed & RPM, use this helpful formula:

Metric Threads

$$\frac{\text{Thread Pitch} \times \text{RPM} \times 1.1}{60} = \text{MM per second of spindle advancement}$$

American Std. Unified Threads

$$\frac{1 \times \text{RPM} \times 1.1}{\text{Pitch} \times 60} = \text{Inches per second of spindle advancement}$$



Lancer #2 shown with TTSL-1.

Multiple and/or Automatic Stud Driving

In all stud driving applications it is necessary to coordinate the axial advancement of the spindle with the RPM and thread pitch of the stud. If the advancement is too rapid, excessive pressure will accelerate the wear on the stud driver. If the advancement is too slow, the jaws will open and close repeatedly causing damage to the stud and decreasing the accuracy of the projection height.

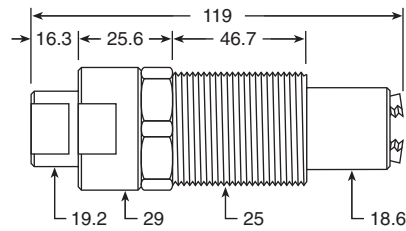
When a stud driver is used manually the operator will quickly learn to apply the necessary pressure to get the stud driver to operate properly. But when the stud drivers are used on automatic or multiple spindle applications it

becomes necessary to add a TTSL between the stud drivers and the spindle to obtain the same result.

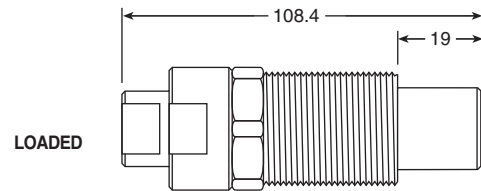
When the TTSL is installed you simply allow the spindle to advance 10% faster than the stud is capable of screwing into the workpiece. The extra 10% will be absorbed by the TTSL and the spring pressure of the TTSL will assure that the stud driver remains loaded onto the stud. This greatly reduces the time needed to successfully setup and fine tune the machinery, and it significantly reduces the risk of tool failure or breakage.

Lancer-1 Physical Dimensions

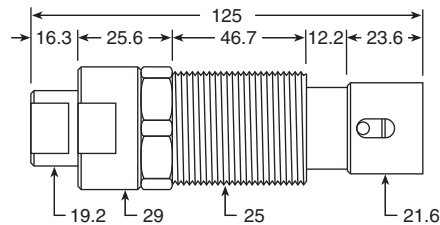
ALL DIMENSIONS ARE IN MILLIMETERS. Tolerance: ± 0.8 mm. Divide by 25.4 mm to convert to inches.



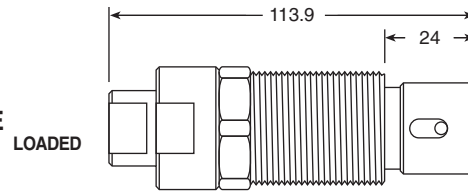
UNLOADED **LESS GAGE**



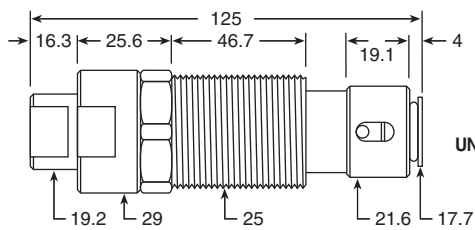
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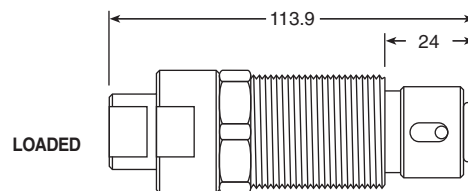
UNLOADED **CENTERING GUIDE**



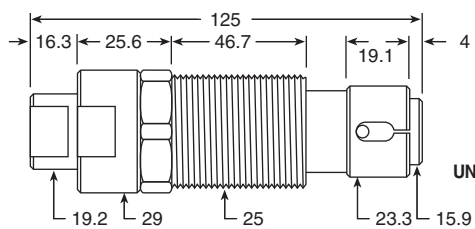
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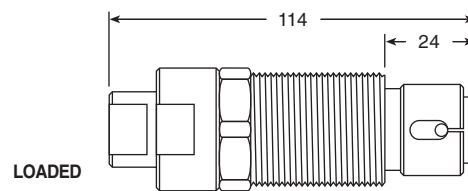
UNLOADED **POSI-LOAD**



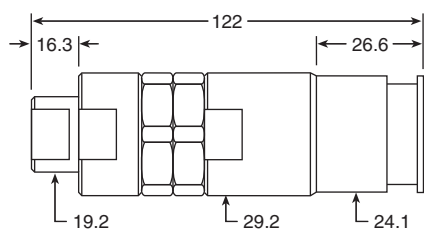
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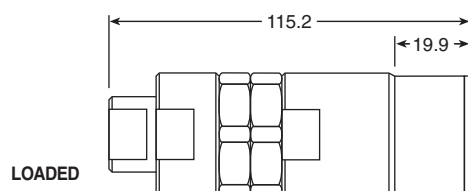
UNLOADED **MACHINE LOAD STUD RETAINER**



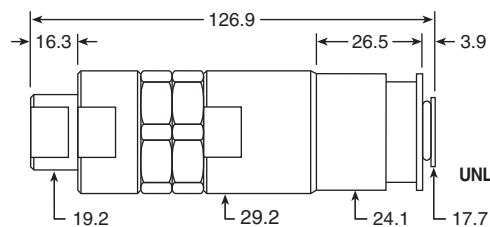
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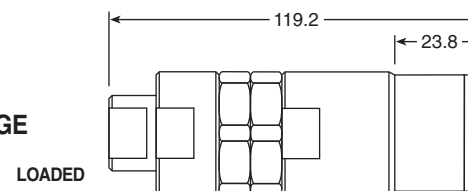
UNLOADED **#10 GAGE SET AT MINIMUM**



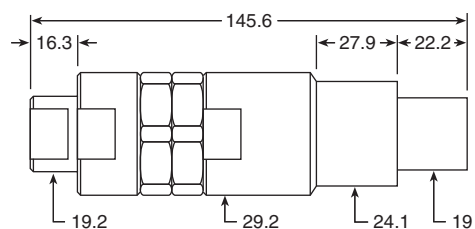
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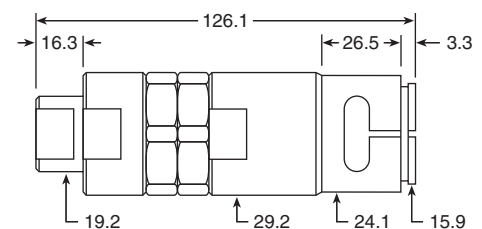
UNLOADED **#10 AUTO-LOAD GAGE SET AT MINIMUM**



LOADED



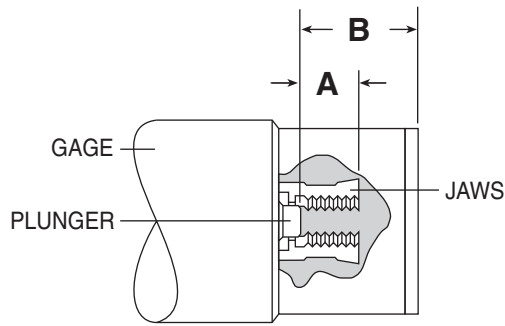
#11 GAGE SET AT MINIMUM
LOADED OR UNLOADED



#10 MACHINE LOAD GAGE SET AT MINIMUM
LOADED OR UNLOADED

#11 AUTO-LOAD GAGE / Same Dimensions
#11 MACHINE LOAD GAGE / Same Dimensions

Lancer-1 Stud Engagement Chart



A - (THREAD GRIP) This figure equals the distance from the end of the jaws to the tip of the plunger.

B - (TOTAL STUD ENGAGEMENT IN FULLY LOADED POSITION) This figure equals the distance from the face of the tool to the tip of the plunger.

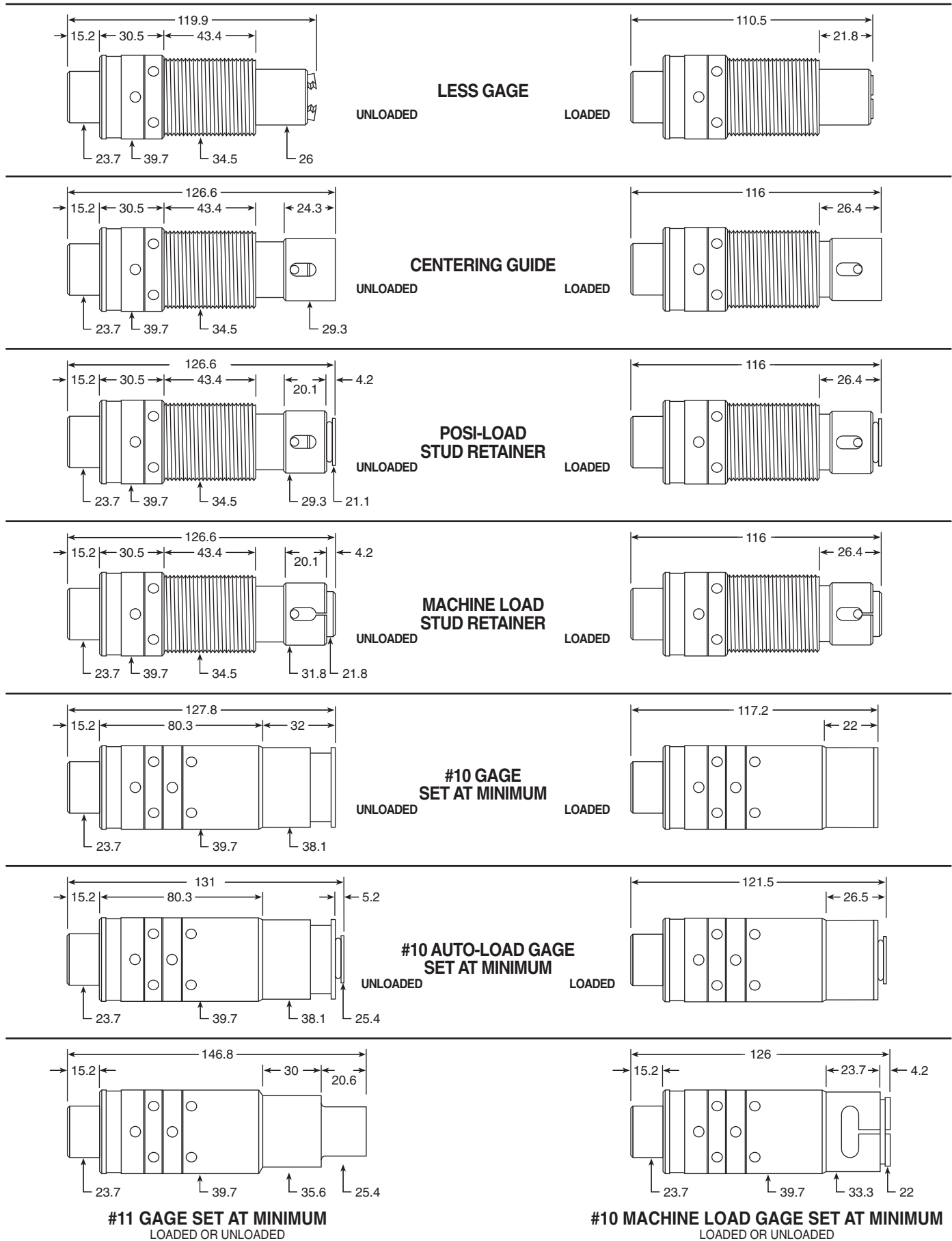
		STUD SIZES	#8, #10, M4, M5	1/4, M6, M7	5/16, M8
A		INCHES MILLIMETERS	9/32" 7.1	3/8" 9.5	15/32" 12
B	CENTERING GUIDE	INCHES MILLIMETERS	13/32" 10.3	5/8" 15.9	23/32" 18.3
	POSI-LOAD STUD RETAINER	INCHES MILLIMETERS	13/32" 10.3	5/8" 15.9	23/32" 18.3
	MACHINE LOAD STUD RETAINER	INCHES MILLIMETERS	Special To Order	5/8" 15.9	23/32" 18.3
	#10 GAGE SET AT MINIMUM	INCHES MILLIMETERS	9/16" 14.3	21/32" 16.7	3/4" 19
	#10 AUTO-LOAD GAGE SET AT MINIMUM	INCHES MILLIMETERS	23/32" 18.3	13/16" 20.6	29/32" 23
	#10 MACHINE LOAD GAGE SET AT MINIMUM	INCHES MILLIMETERS	31/32" 24.6	1-1/16" 27	1-5/32" 29.4
	#11 GAGE SET AT MINIMUM #11 AUTO-LOAD GAGE SET AT MINIMUM #11 MACHINE LOAD GAGE SET AT MINIMUM	INCHES MILLIMETERS	1-3/4" 44.5	1-27/32" 46.8	1-15/16" 49.2

NOTE: All dimensions are plus or minus 1/32" or 0.8 mm.

IMPORTANT: For studs with thread lengths shorter than dimension "A" contact Titan Tool Co. for special modifications.

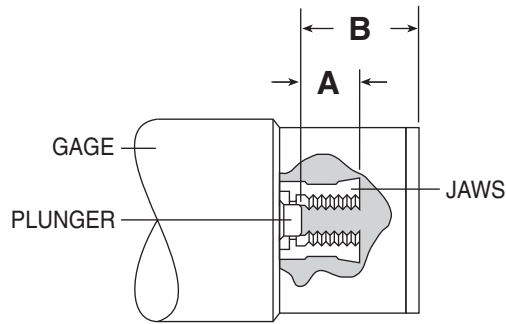
Lancer-2 Physical Dimensions

ALL DIMENSIONS ARE IN MILLIMETERS. Tolerance; ± 0.8 mm. Divide by 25.4 mm to convert to inches.



#11 AUTO-LOAD GAGE / Same Dimensions
#11 MACHINE LOAD GAGE / Same Dimensions

Lancer-2 Stud Engagement Chart



A - (THREAD GRIP) This figure equals the distance from the end of the jaws to the tip of the plunger.

B - (TOTAL STUD ENGAGEMENT IN FULLY LOADED POSITION) This figure equals the distance from the face of the tool to the tip of the plunger.

		STUD SIZES	1/4", M6, M7	5/16", 3/8", 7/16", M8, M10
A		INCHES	3/8"	15/32"
		MILLIMETERS	9.5	12
B	CENTERING GUIDE	INCHES MILLIMETERS	19/32" 15	11/16" 17.5
	POSI-LOAD STUD RETAINER	INCHES MILLIMETERS	19/32" 15	11/16" 17.5
	MACHINE LOAD STUD RETAINER	INCHES MILLIMETERS	19/32" 15	11/16" 17.5
	#10 GAGE SET AT MINIMUM	INCHES MILLIMETERS	21/32" 16.7	3/4" 19
	#10 AUTO-LOAD GAGE SET AT MINIMUM	INCHES MILLIMETERS	13/16" 20.6	29/32" 23
	#10 MACHINE LOAD GAGE SET AT MINIMUM	INCHES MILLIMETERS	1" 25.4	1-3/32" 27.8
	#11 GAGE SET AT MINIMUM #11 AUTO-LOAD GAGE SET AT MINIMUM #11 MACHINE LOAD GAGE SET AT MINIMUM	INCHES MILLIMETERS	1-27/32" 46.8	1-15/16" 49.2

NOTE: All dimensions are plus or minus 1/32" or 0.8 mm.

IMPORTANT: For studs with thread lengths shorter than dimension "A" contact Titan Tool Co. for special modifications.

Lancer® Series Micro-Matic Stud Driver

Ordering Information

TOOL SIZE	STUD SIZE (Choose One)		PERFORMANCE FEATURE (Choose One)	BODY TYPE Choose ET or P	FEMALE ADAPTION (Choose One)
LANCER-1	#8-32	M4 x .7	Centering Guide	ET or P	3/8"-24 Threaded
	#10-24	M5 x .8	#1 Open Gage		1/2"-20 Threaded
LANCER-2	#10-32	M6 x 1.00	#10 Gage		5/8"-16 Threaded
	1/4"-20	M7 x 1.00	#11-15 Gage		M14 x 1.00
LANCER-2	1/4"-28	M8 x 1.25	Posi-Load Stud Retainer		3/8" Square
	5/16"-18	M8 x 1.00	* ML Stud Retainer		1/2" Round
LANCER-2	5/16"-24	M6 x 1.00	#10 ML Auto-Load Gage		3/8"-24 Threaded
	3/8"-16	M7 x 1.00	* #10 ML Machine Load Gage		1/2"-20 Threaded
LANCER-2	3/8"-24	M8 x 1.25	#11-15 AL Gage		5/8"-16 Threaded
	7/16"-14	M8 x 1.00	* #11-15 ML Gage		M14 x 1.00
LANCER-2	7/16"-20	M10 x 1.50			M16 x 1.00
		M10 x 1.25			3/8" Square
LANCER-2					1/2"
					1/2" Round
LANCER-2					5/8"

*All Machine Load (ML) Types must be fitted to your sample stud. Therefore sample stud must be sent with purchase order.

Examples for Ordering

All examples shown below assume either 3/8" male square or M16 x 1.00 male thread on power source.

A. M6 x 1.00 stud to be pre-loaded into LANCER and driven to 18 mm projection height (height controlled by tool): SPECIFY: LANCER-1, M6 x 1.00, #10 AL Gage set at 18 mm, P-Body 3/8" square.
B. 3/8"-16 stud to be hand started into the workpiece and driven to a torque of 16' lb.: SPECIFY: LANCER-2, 3/8"-16, Centering Guide, ET-Body 3/8" square.
C. M8 x 1.25 stud to be pre-loaded by shuttle system into Lancer and driven to 20 mm projection height (Projection controlled by spindle stop: axial travel stops - but rotation continues on timed cycle): SPECIFY: LANCER-2, M8 x 1.25, ML Posi-Load, P-Body , M16 x 1.00 Female Drive.
D. Same as example C but: Spindle rotation stops instantly with axial travel: SPECIFY: LANCER-2, M8 x 1.25, ML Posi-Load, ET Body , M16 x 1.00 Female Drive.
E. M8 x 1.25 stud to be pre-loaded by shuttle system into Lancer and driven to 70 mm projection (Projection controlled by spindle stop, rotation and axial travel stops at same time): SPECIFY: LANCER-2, M8 x 1.25, #11 ML Gage, ET Body , M16 x 1.00 Female Drive. (Longer Machine Load Gage supports long stud better, yet Gage will not touch workpiece surface).
Automatic/Multiple Spindles: For enhanced performance always use TTSL on Lancer® Stud Drivers.

Before Ordering:

TITAN TOOL COMPANY has specialized in stud driving since 1920. We offer many years of experience in this field. We encourage you to contact us before proceeding with any new applications involving our tools. Our service is prompt and free of charge.

Important:

- SEND COMPLETED "CUSTOMER SPECIFICATION SHEET" WITH ORDER
- INCLUDE SAMPLE STUD WITH ORDER
- DO NOT USE IMPACT WRENCHES
- USE A TTSL WHEREVER NECESSARY

Patents:

U.S. Patent Numbers:

4,470,329 4,476,749 4,513,643 4,819,519 5,119,700

Multiple corresponding patents issued in the following countries.

Canada, France, Great Britain, Indonesia, Italy, Japan, Korea, Mexico, Spain, Sweden, Taiwan, Germany.



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