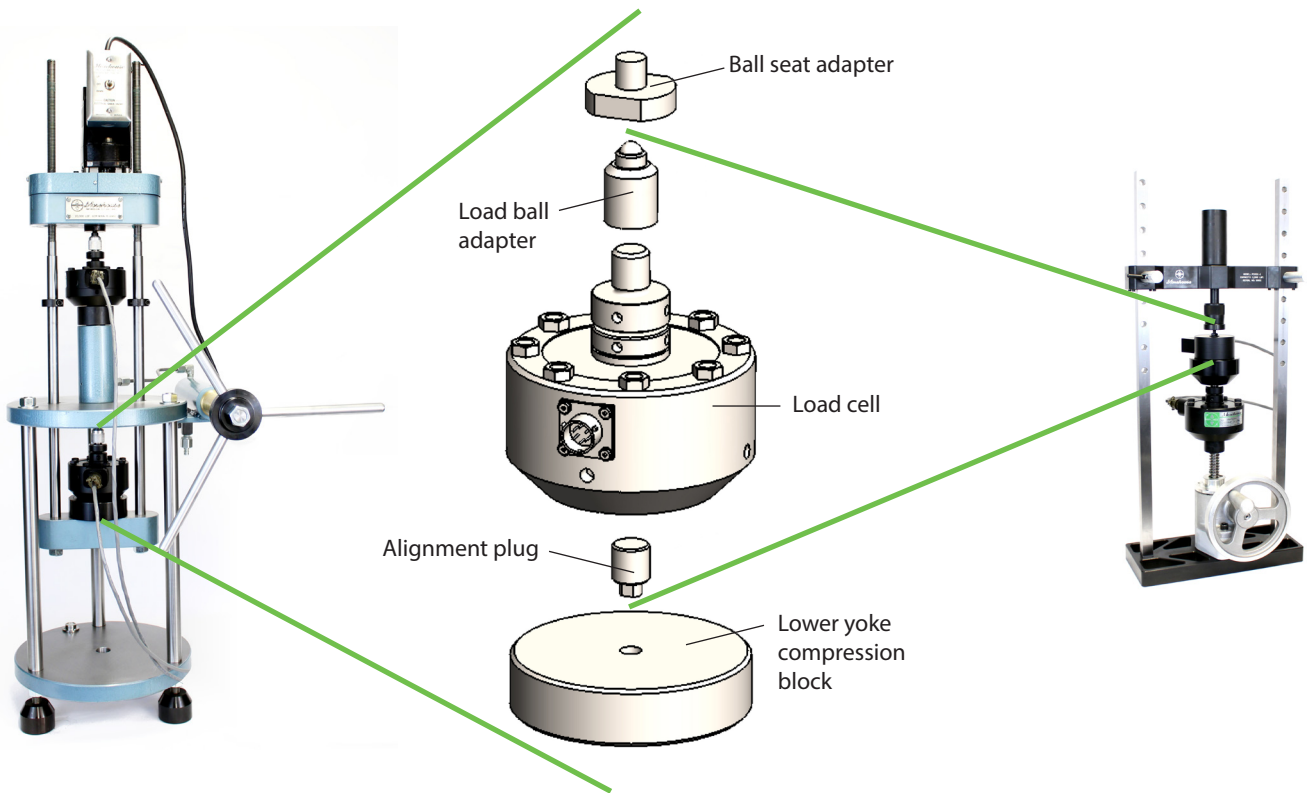


Application Guide

Force Calibration Setups and Adapters



Importance of Adapters for Force Calibration

This application guide includes examples of typical calibration setups and the associated adapters. When using the right setups and adapters, calibration technicians have the highest probability of meeting the requested specifications. Keeping the line of force pure, or free from eccentric forces, is key. Not using the proper adapters to calibrate force-measuring devices can produce significant measurement errors and pose serious safety concerns.

No matter how good an operator may be, they are no match for a precision machined adapter. When they must use tools to center everything, it takes extra time to measure, center, and measure again before they start the calibration.

Morehouse adapters standardize the calibration process, simplify setup, improve cycle time, reduce errors, and improve safety. They are designed and manufactured according to guidelines in the ISO 376 standard and are available in multiple capacities and sizes. For more information, read [Recommended Compression and Tension Adapters for Force Calibration](#).



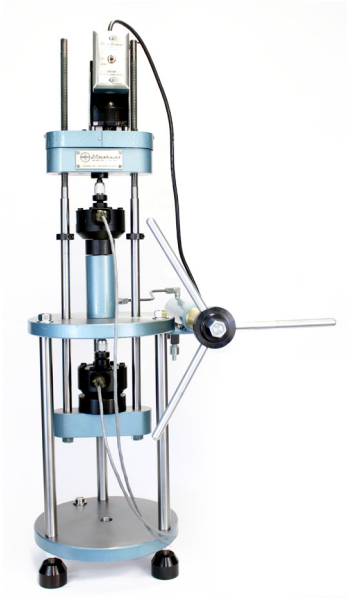
Calibration Technician Aligning a Load Cell with Adapters

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Calibrating Machine / Adapter Key

The adapters in this guide are designed for specific calibrating machines. They are available in multiple capacities and sizes. The color key below is used throughout the guide to identify the type of machine where each adapter can be used.



■ Universal Calibrating Machine



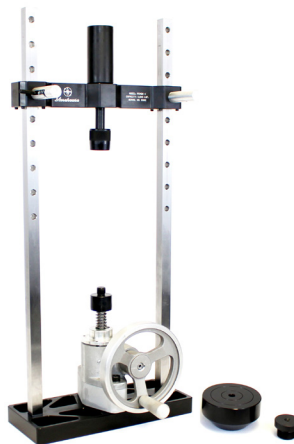
■ Deadweight Calibrating Machine



■ Mechanical Tensiometer Calibrator



■ Benchtop Calibrating Machine



■ Portable Calibrating Machine

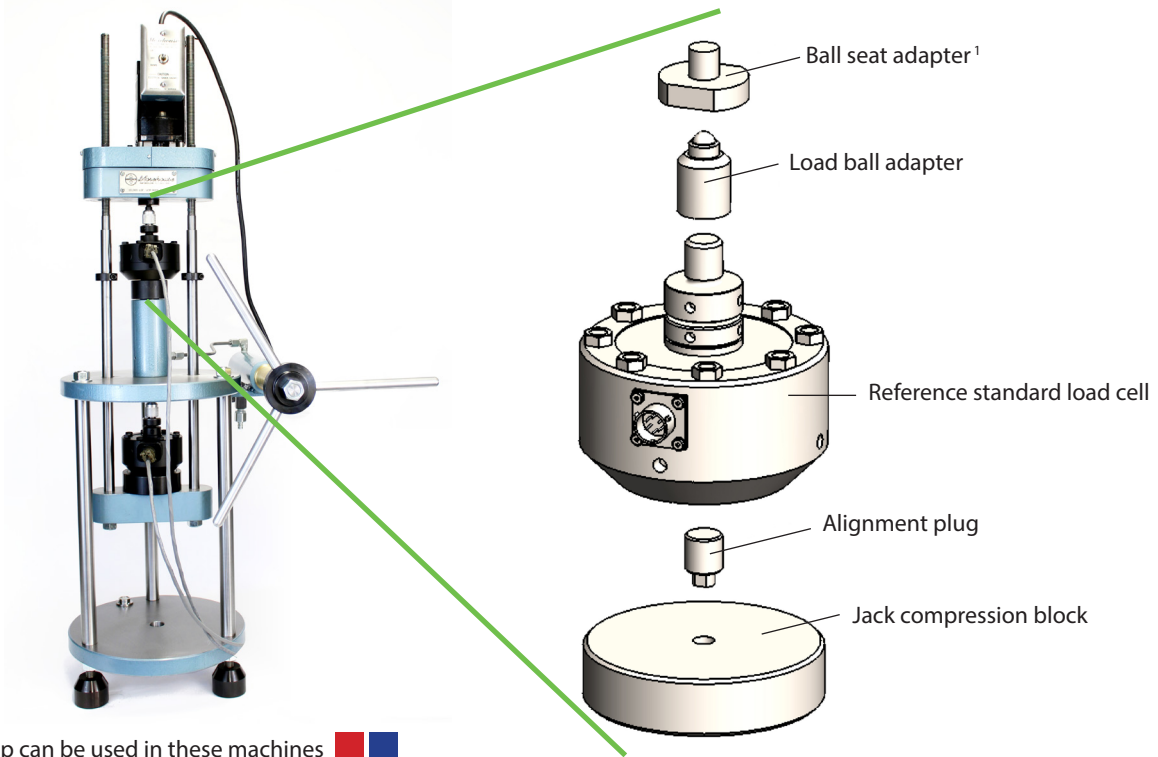



■ Universal Scale Calibrator

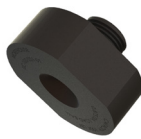
Adapters are available in multiple capacities and sizes



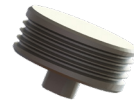
Reference Standard Setup - UCM (up to 200,000 lbf/700 kN)



Setup can be used in these machines 



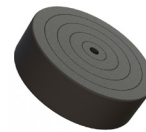
Ball Seat Adapter¹



Alignment Plug



Load Ball Adapter

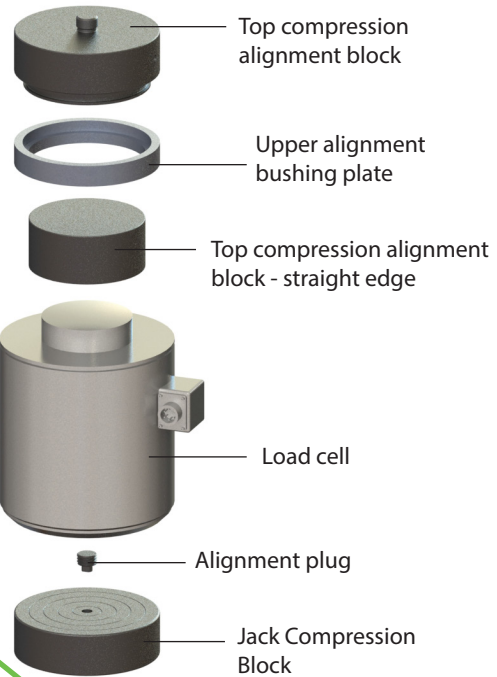


Jack Compression Block

¹ The ball seat adapter is not needed for the deadweight machine.



Reference Standard Setup - UCM (200,000 lbf/700 kN and up)



If you want to decrease your compression area, Morehouse can provide jack extension blocks for the reference standard.

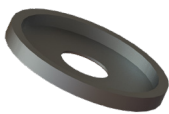
Setup can be used in this machine 



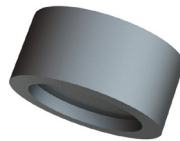
Alignment Plug



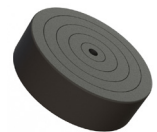
Top compression alignment block



Upper alignment bushing plate



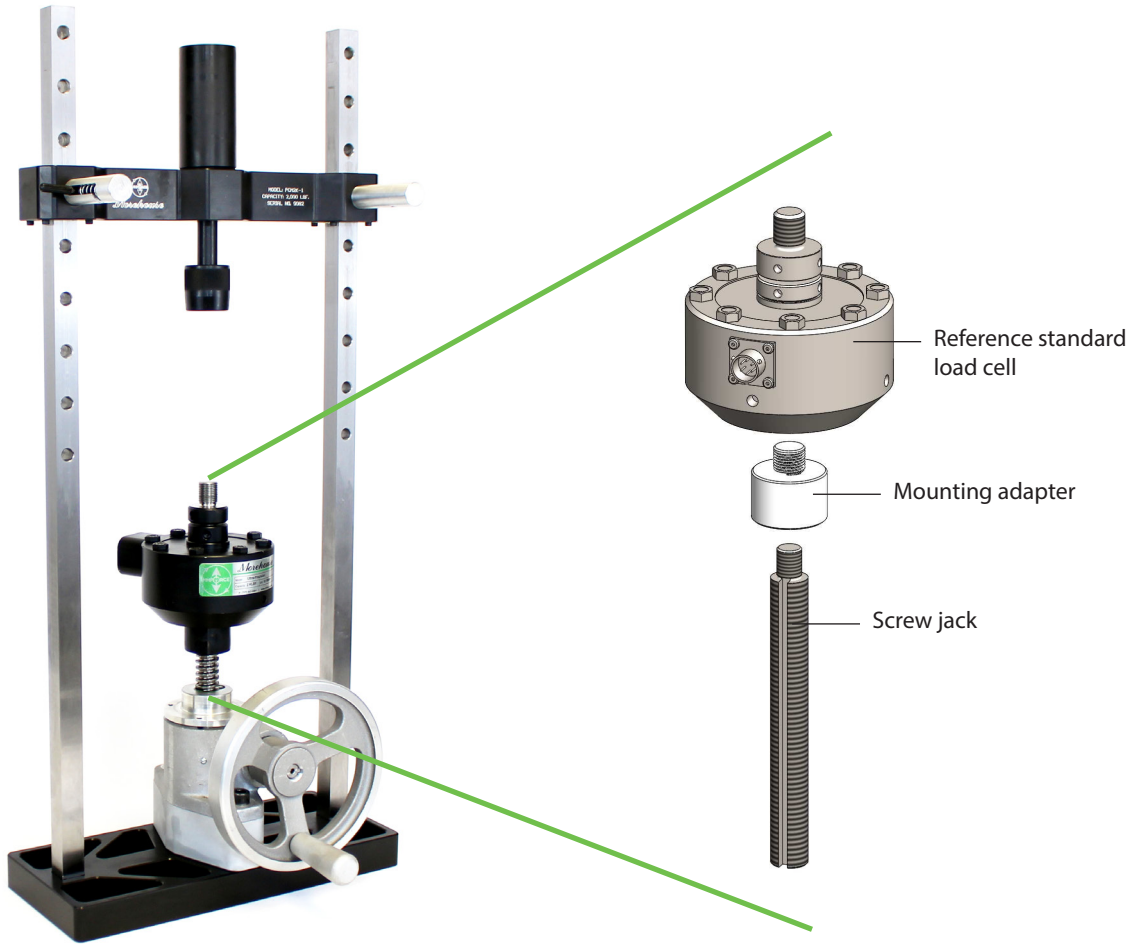
Top compression alignment block - straight edge



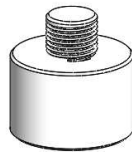
Jack Compression Block



Reference Standard Setup - PCM



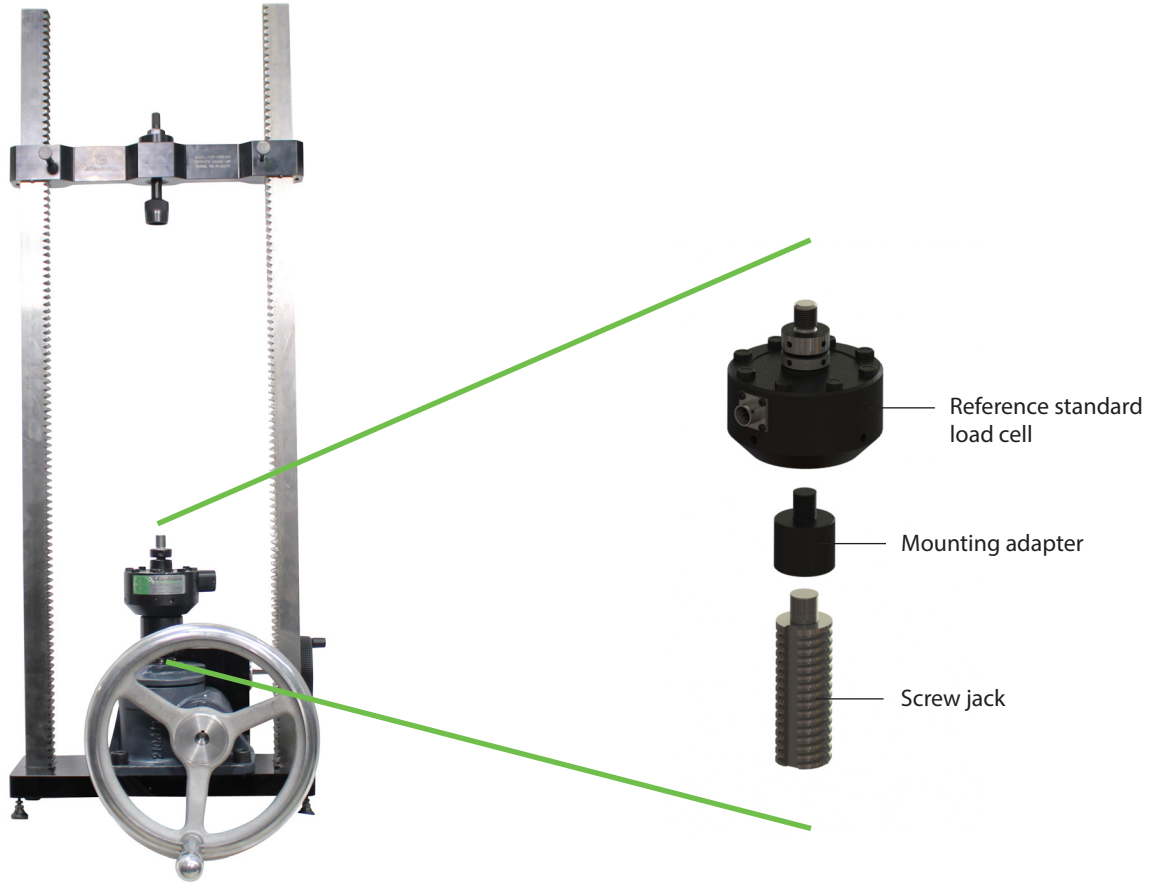
Setup can be used in this machine 




Mounting adapter



Reference Standard Setup - BCM



Setup can be used in this machine 

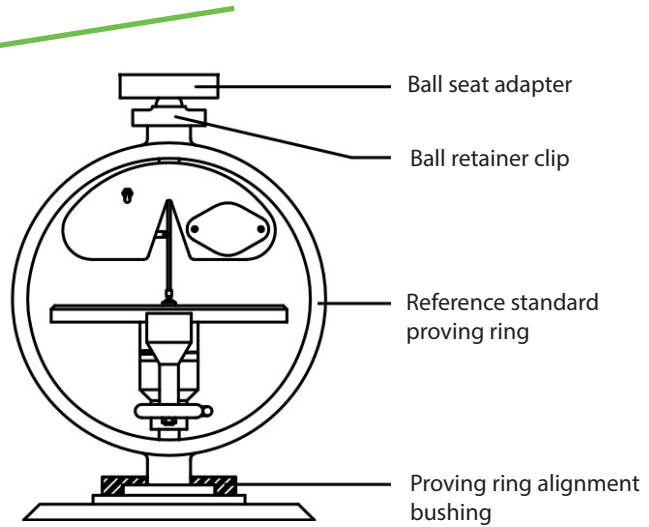
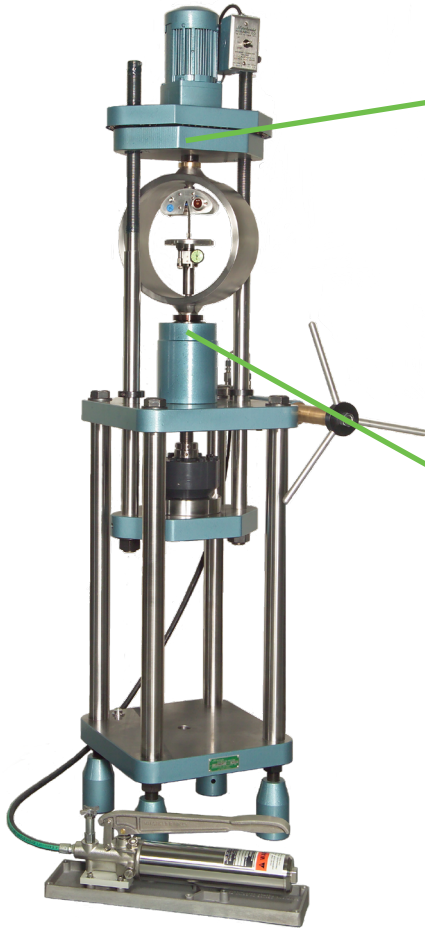


Mounting adapter

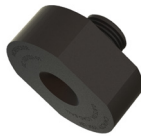
A mounting adapter is included with each benchtop calibrating machine. It is threaded to the top of the jack from one side. The top side of the adapter with external thread is then used to install the reference standard.



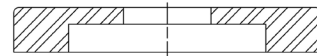
Proving Ring Reference Standard Setup



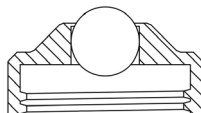
Setup can be used in this machine ■



Ball Seat Adapter



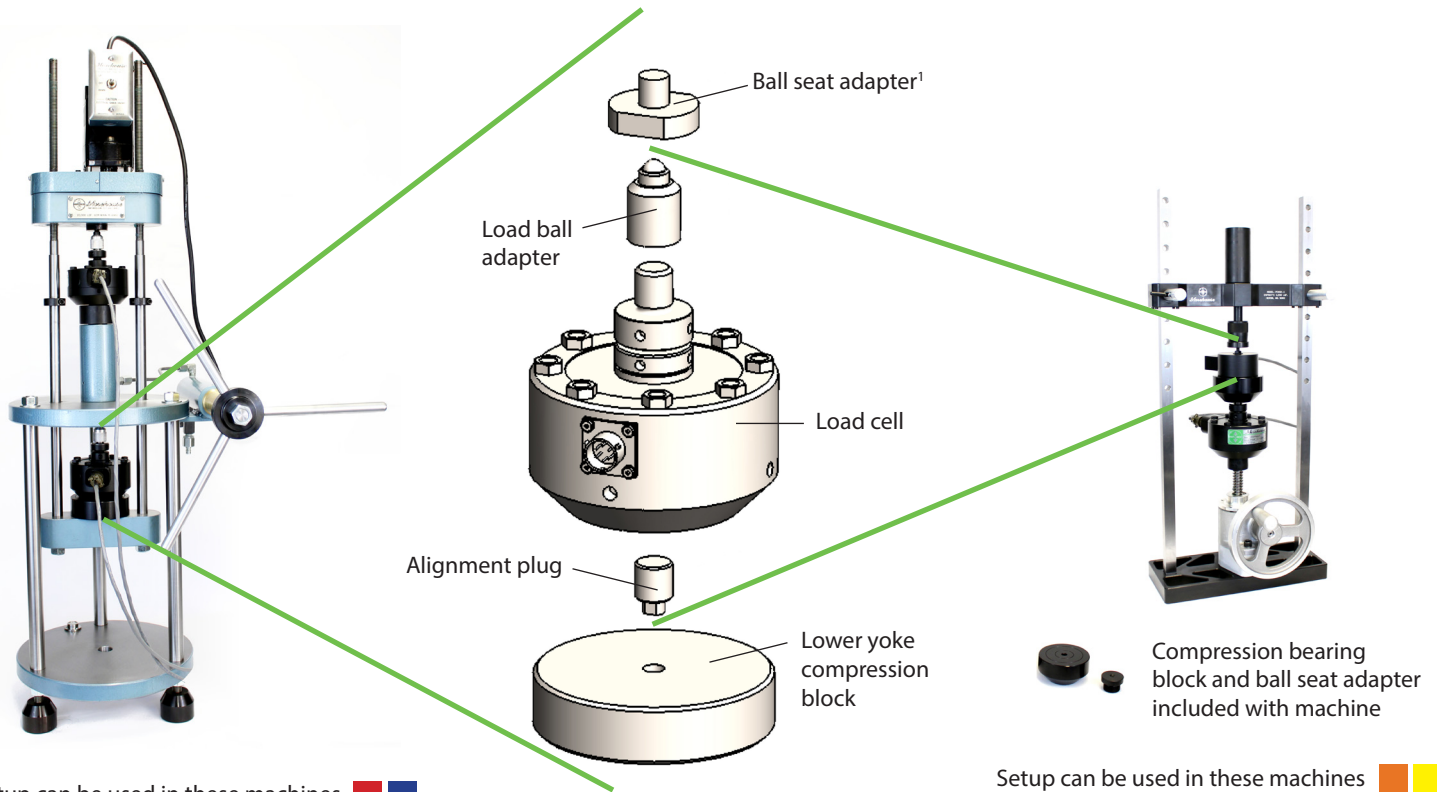
Proving Ring Alignment Bushing



Proving Ring Ball Retainer Clip



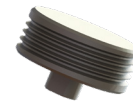
Compression Setup - Load Cell (low capacity)



Ball Seat Adapter¹



Load Ball Adapter



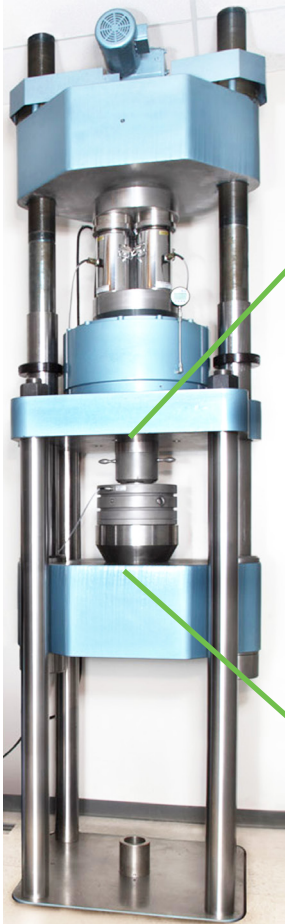
Alignment Plug



Lower Yoke Compression Block

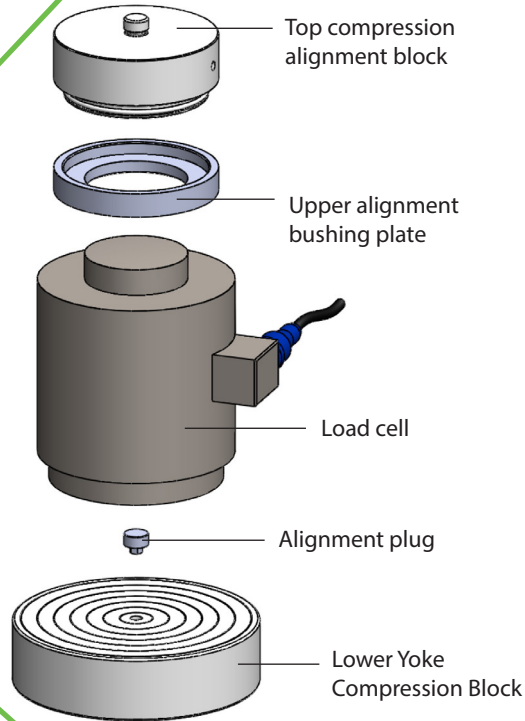
¹ The ball seat adapter is not needed for the deadweight machine.

Compression Setup - Load Cell (high capacity)

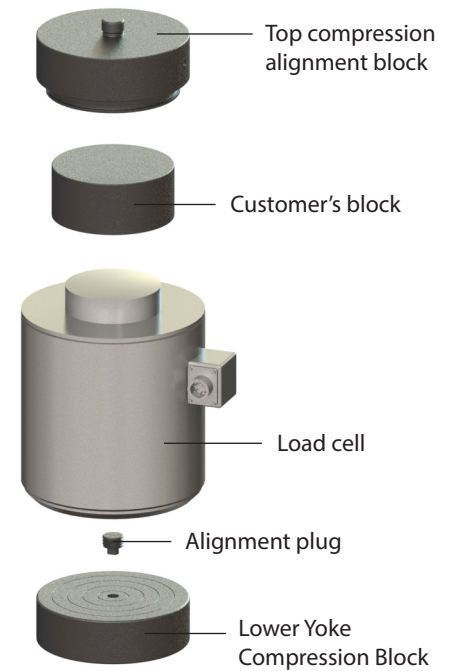


Setup can be used in this machine ■

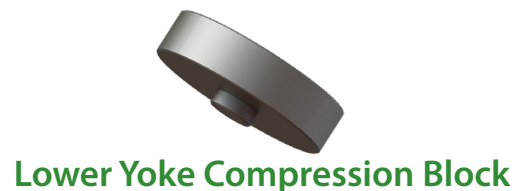
Setup 1: Customer does not send their block



Setup 2: Customer sends their block (best practice)

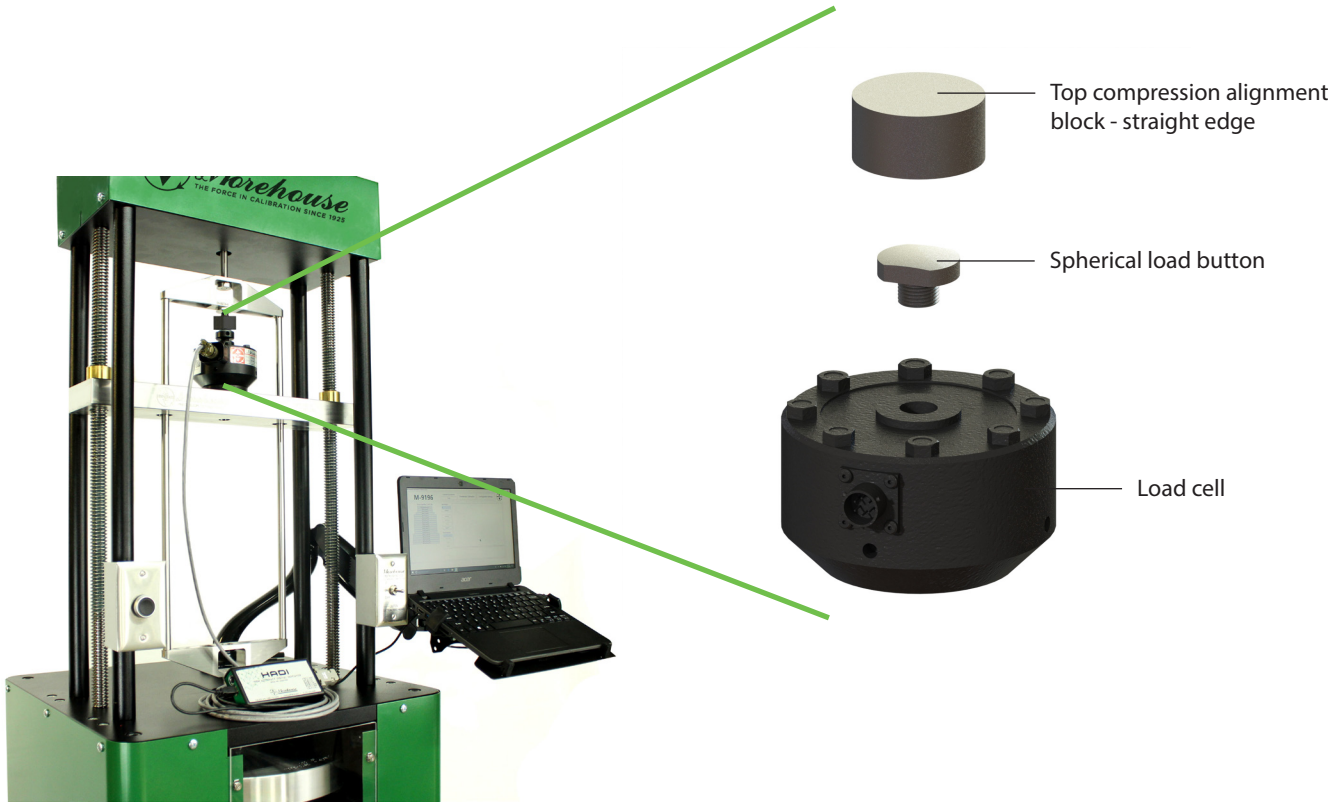



When a load cell is sent for calibration, the end-user should also send their top block. We have found that integral top blocks like [CG-1](#) work well at reducing errors.

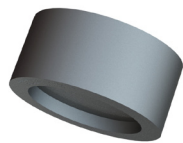




Compression Setup - Load Cell (without Integral Adapter)



Setup can be used in these machines 



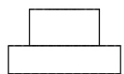
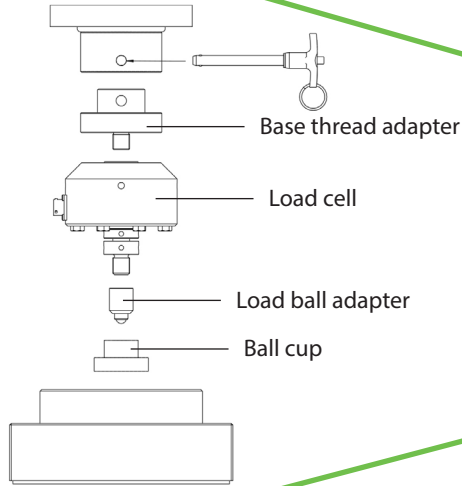
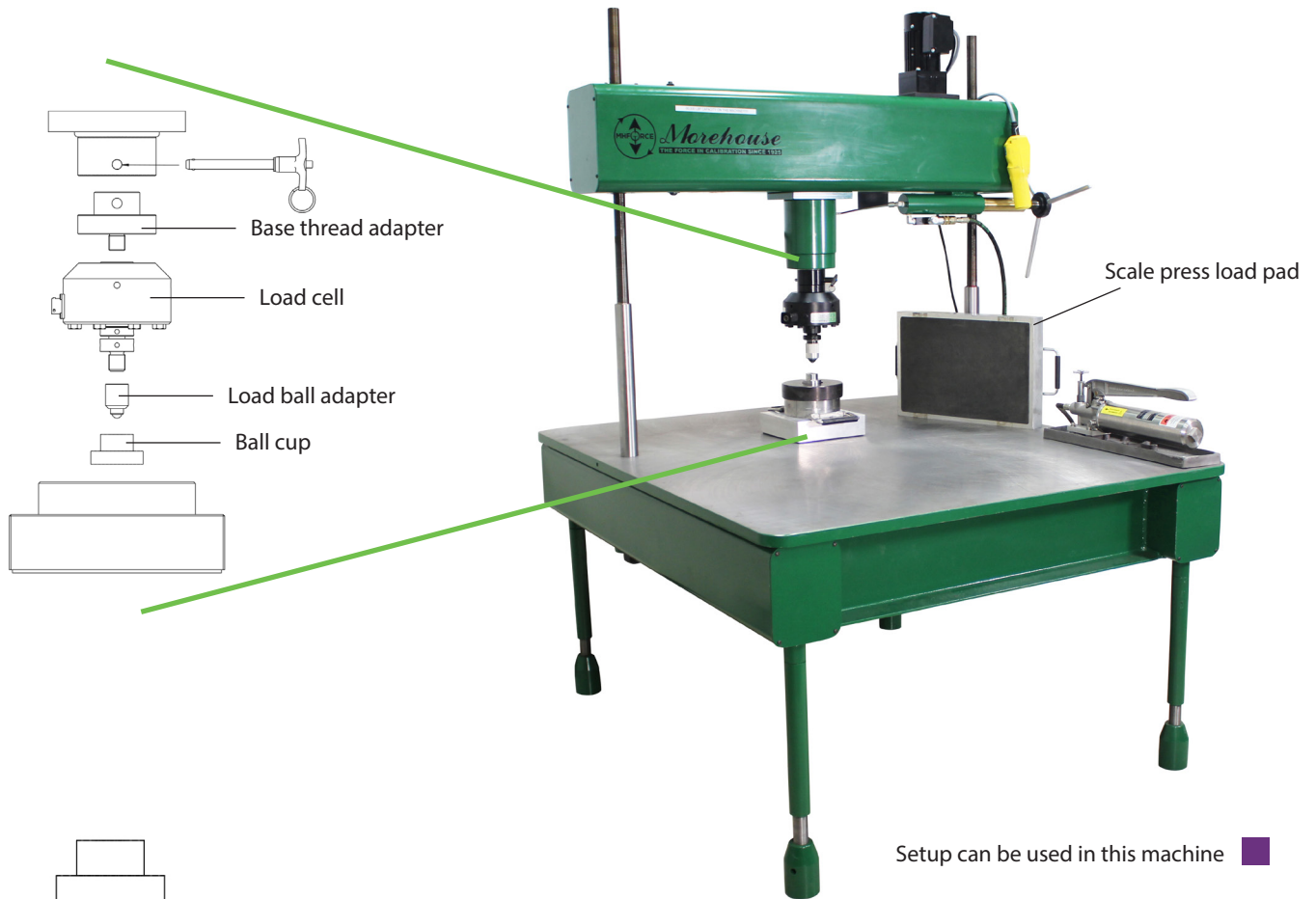
Top compression alignment block - straight edge



Spherical Load Button



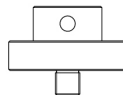
Compression Setup - Aircraft and Truck Scale



Ball cup



Load Ball Adapter



Base thread adapter

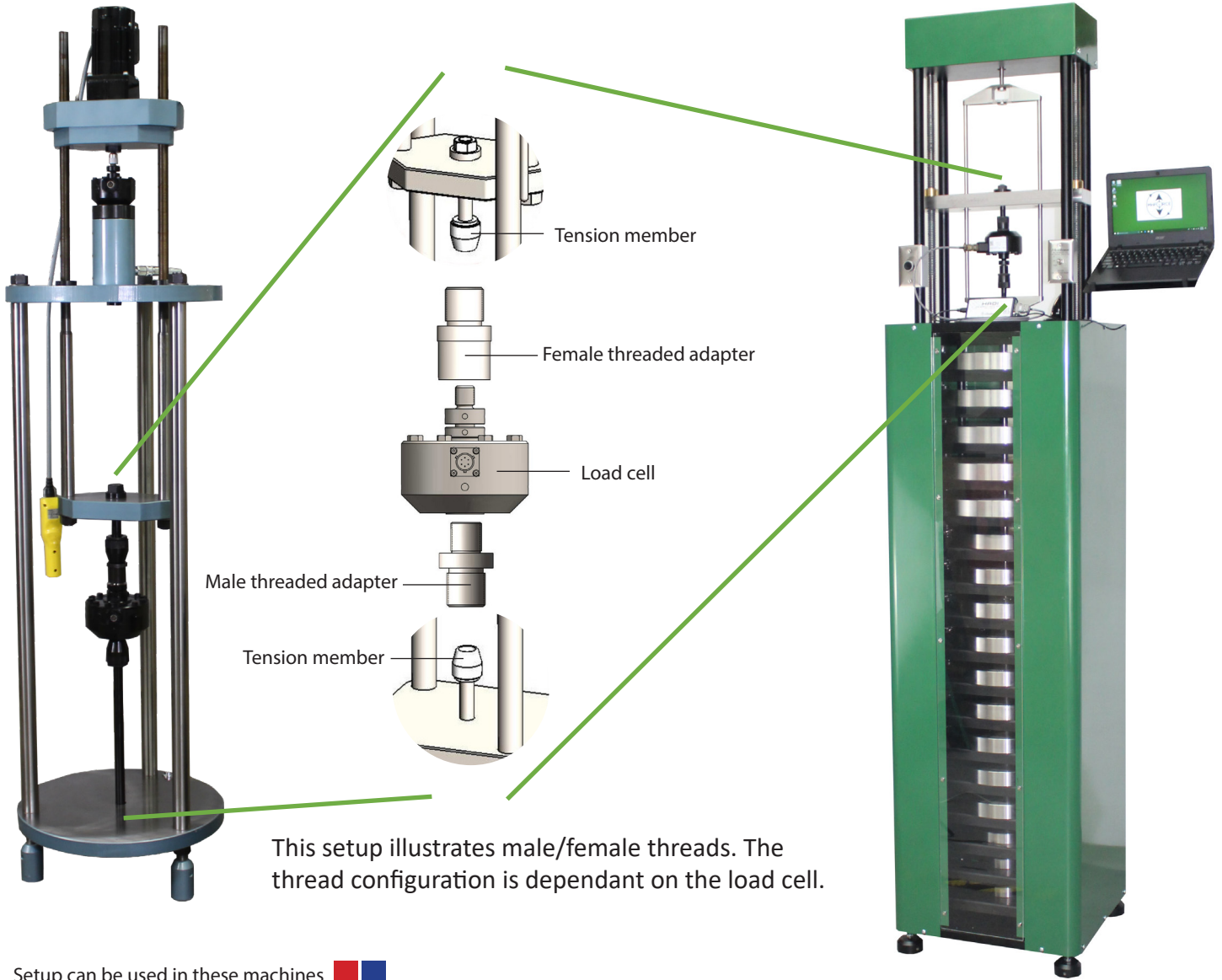



Scale Press Load Pad

Morehouse has a line of aircraft and truck calibration presses. We can make adapters that simulate the tire for any scale. Contact us for more details.



Tension Setup - Load Cell (1,000 to 120,000 lbf)



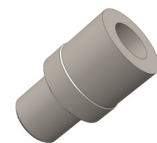
Setup can be used in these machines 



Tension Member



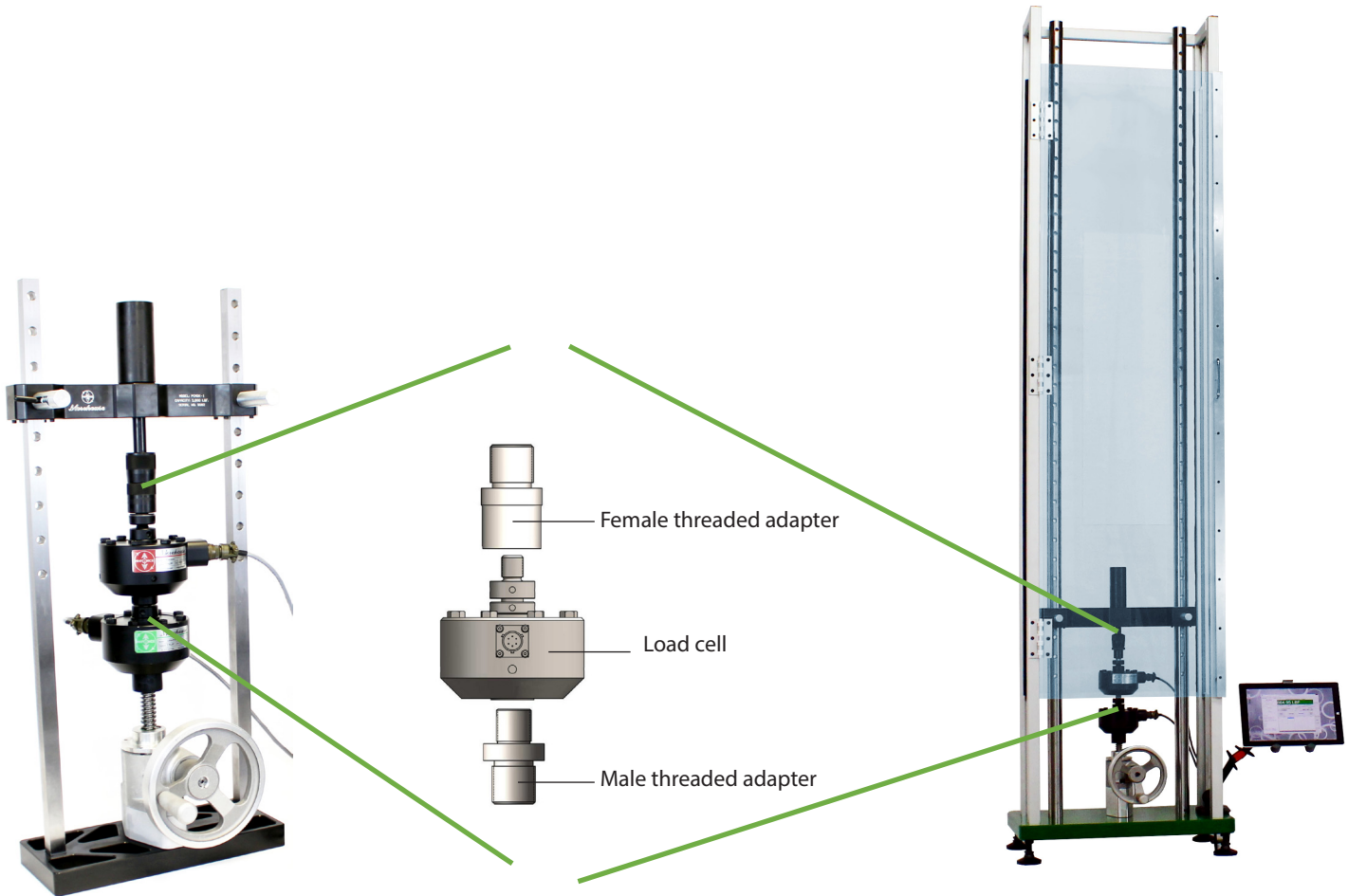
Male Threaded Adapter



Female Threaded Adapter



Tension Setup - Load Cell (1,000 to 120,000 lbf)

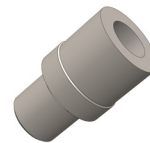


This setup illustrates male/female threads. The thread configuration is dependent on the load cell. The bottom male thread is not used in the machines pictured here.

Setup can be used in these machines



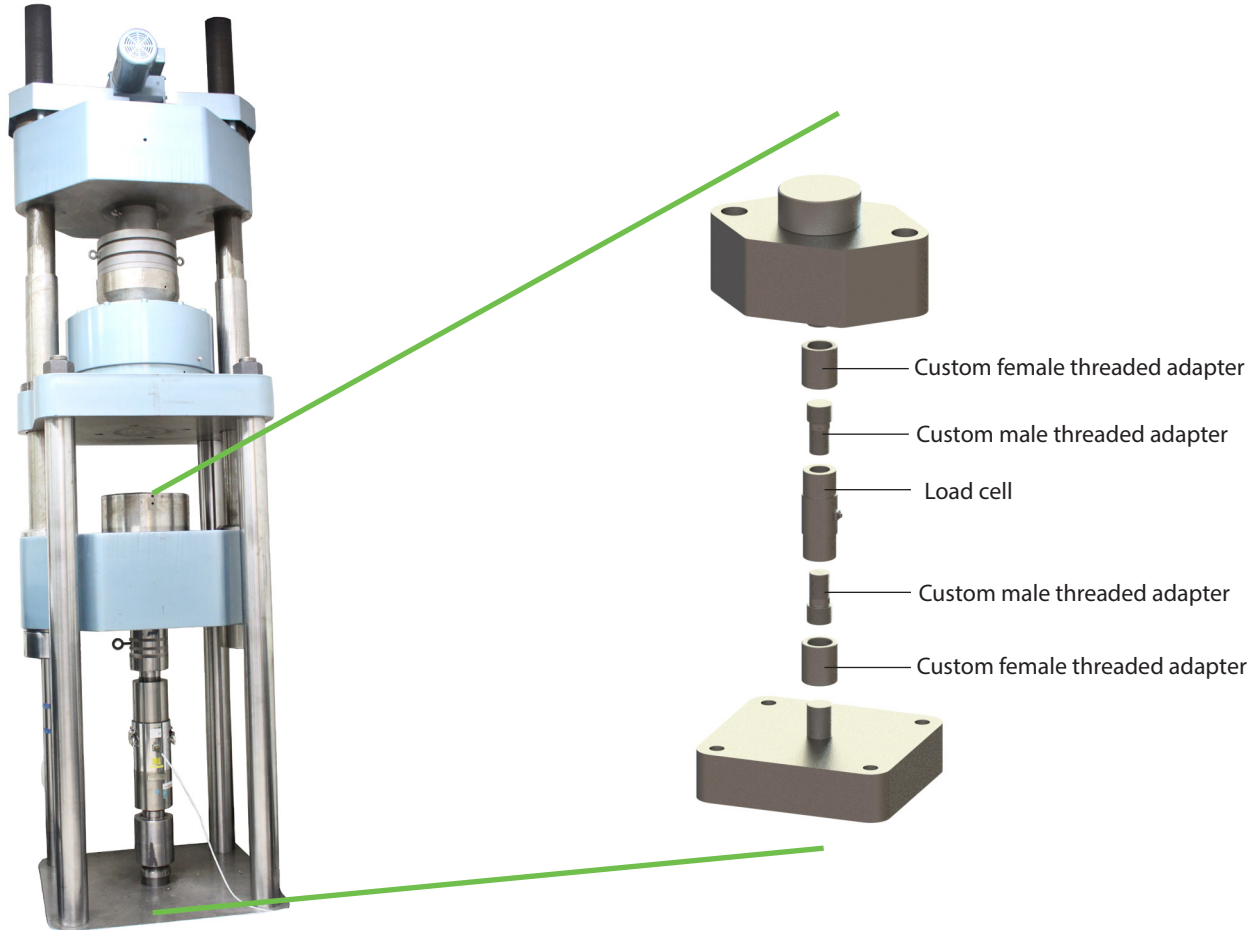
Male Threaded Adapter




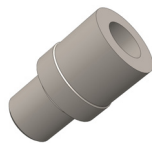
Female Threaded Adapter



Tension Setup - Load Cell (200,000 to 1,200,000 lbf)



Setup can be used in these machines 



Custom Female Threaded Adapter

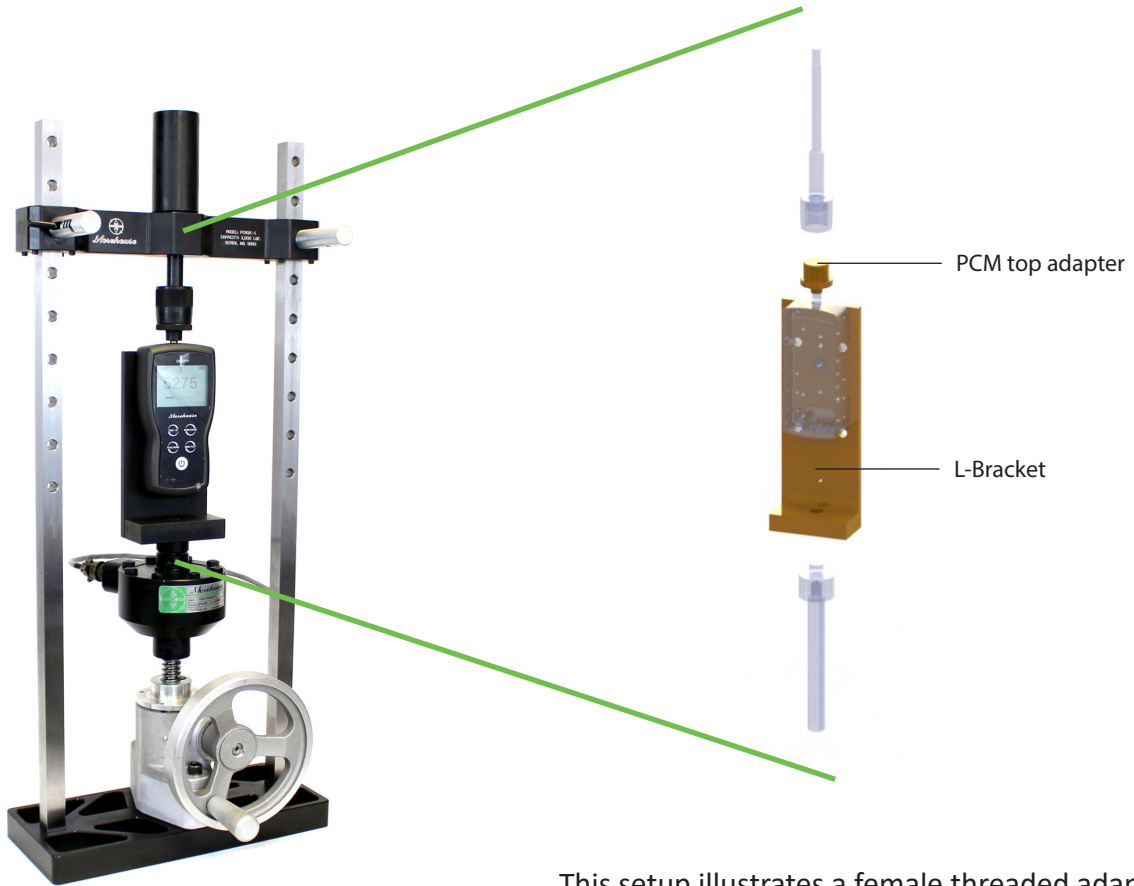


Custom Male Threaded Adapter

Contact Morehouse for details on custom threaded adapters.



Compression & Tension Setup - Handheld Force Gauge

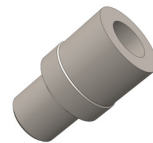


Setup can be used in these machines

This setup illustrates a female threaded adapter. The thread configuration is dependent on the instrument.



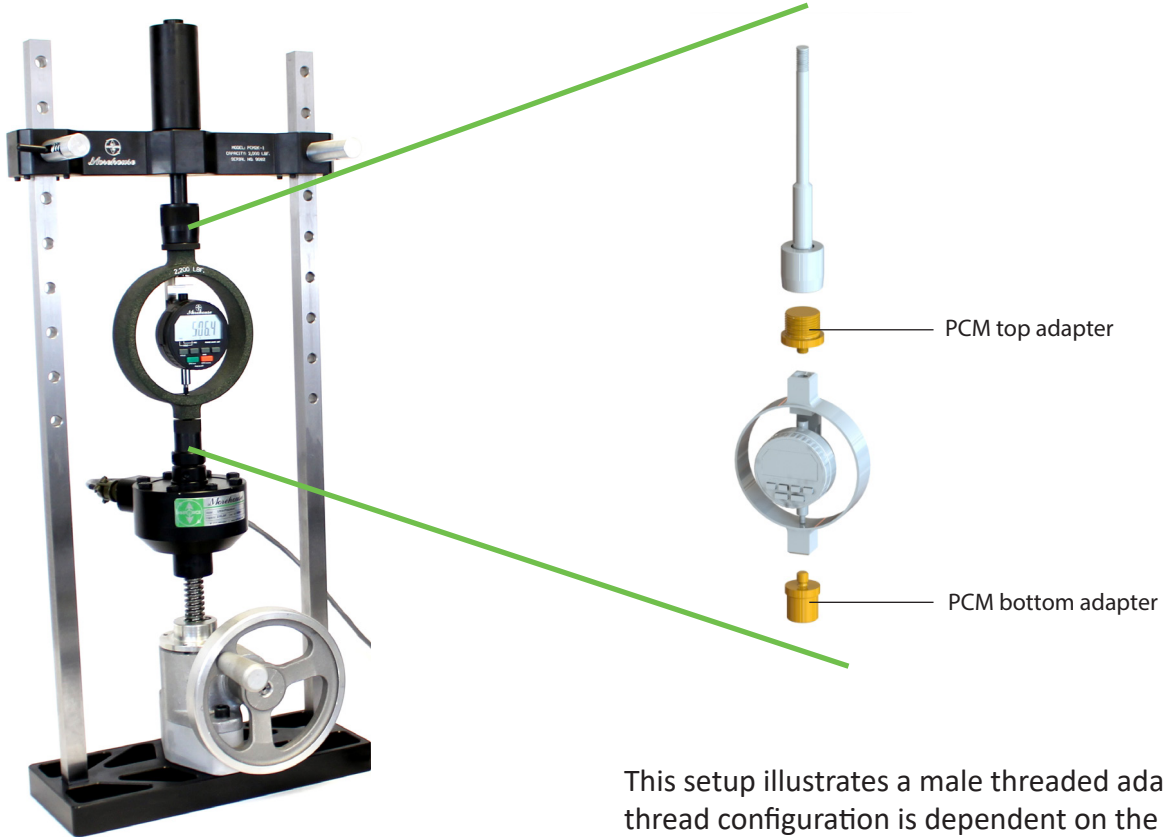
L-Bracket





PCM Top Adapter

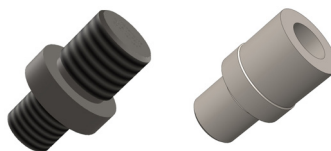


Tension Setup - Analog and Digital Force Gauge



This setup illustrates a male threaded adapter. The thread configuration is dependent on the instrument.

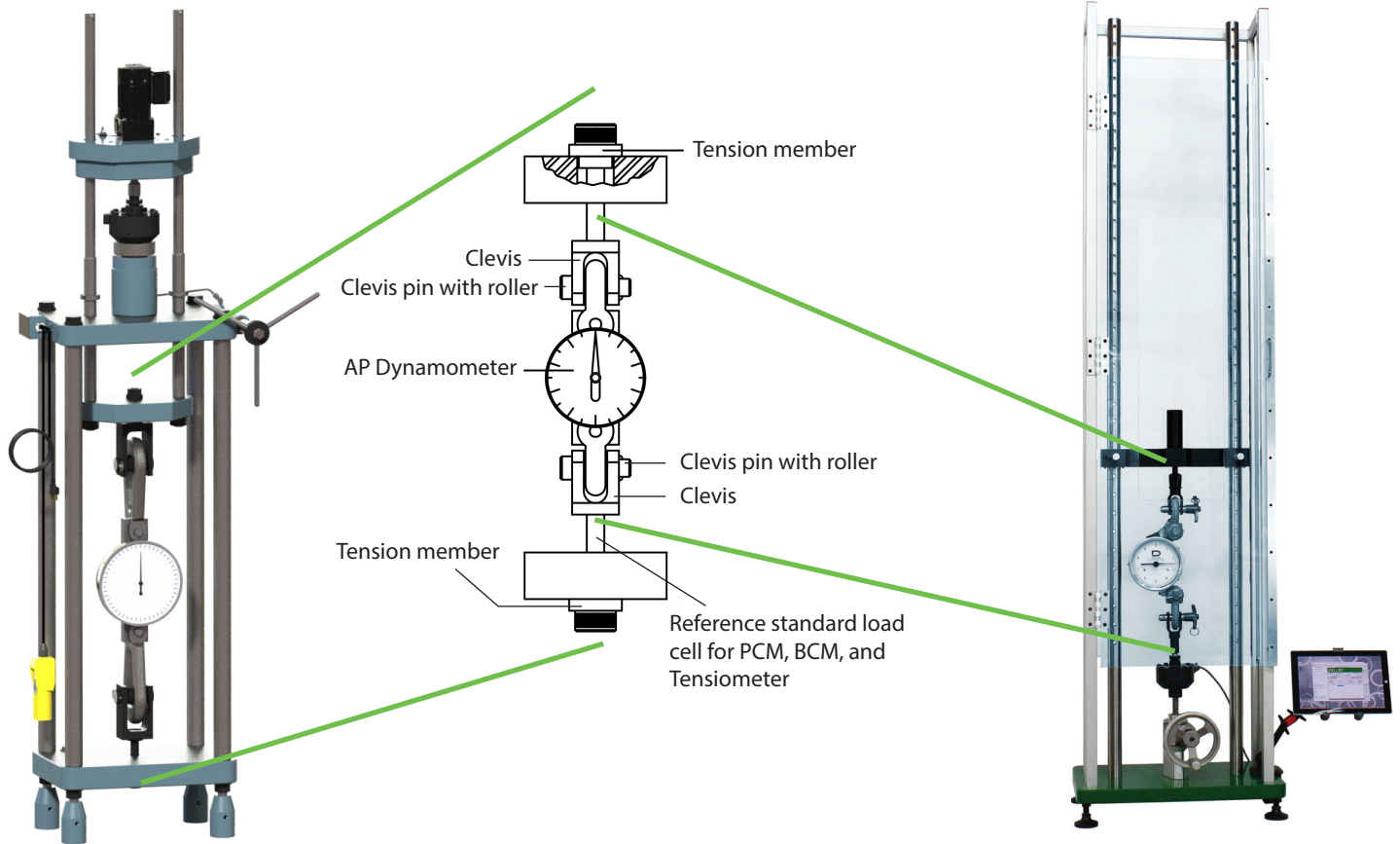
Setup can be used in these machines  



PCM Top and Bottom Adapters



Tension Setup - AP dynamometer



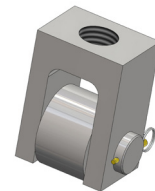
Setup can be used in these machines



Setup can be used in these machines



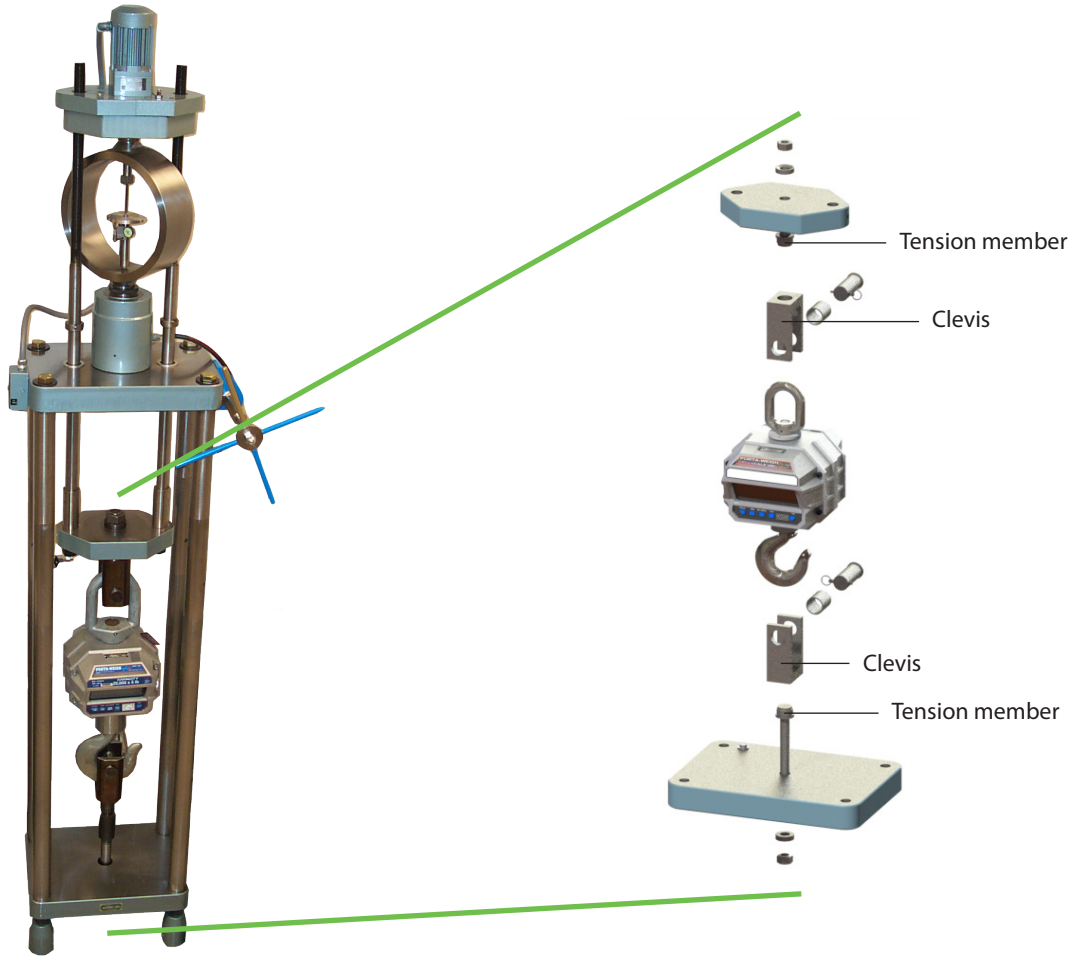
Tension Member




Clevis



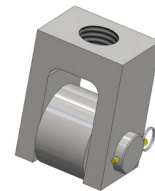
Tension Setup - Crane Scale (up to 120,000 lbf)



Setup can be used in these machines 



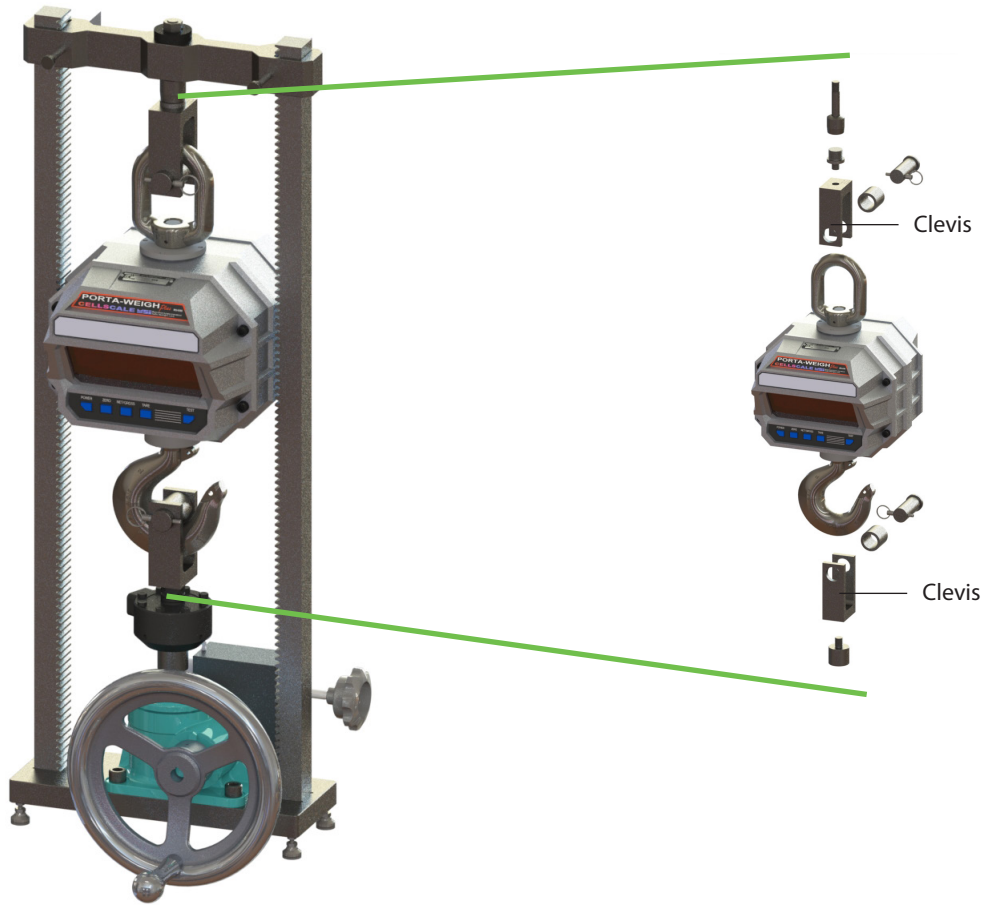
Tension Member




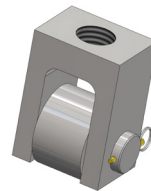
Clevis



Tension Setup - Crane Scale (up to 10,000 lbf)



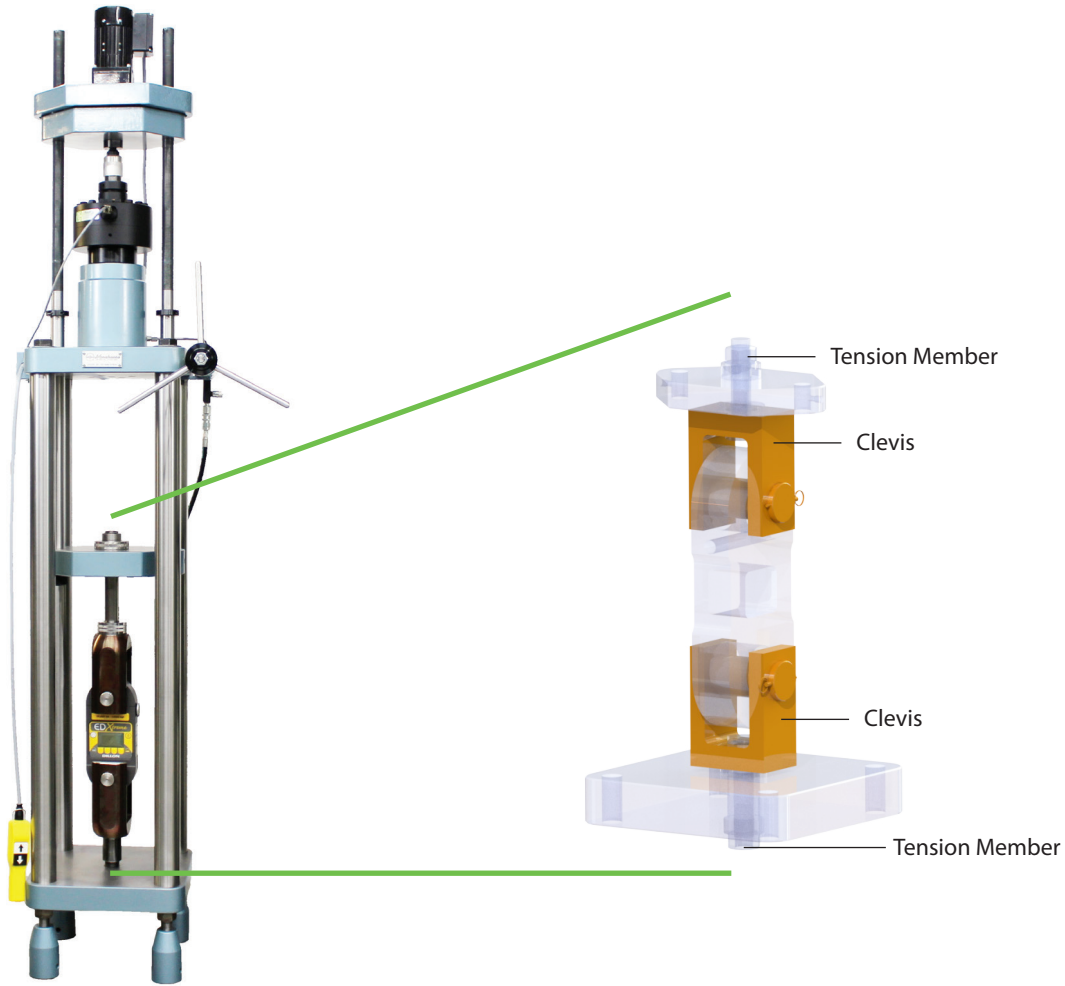
Setup can be used in this machine 





Clevis



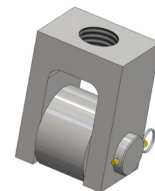
Tension Setup - Tension Link (up to 120,000 lbf)



Setup can be used in these machines  



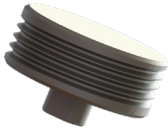
Tension Member



Clevis



Alignment Plug (CA)



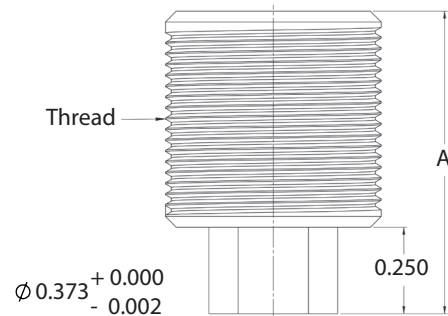
The alignment plug threads into the load cell and helps center it in a calibrating machine.

Adapters for Morehouse Load Cells

Part No.	Original Part No.	Thread	A	Load Cell Type	Load Cell Capacity (lbf)
CA-1-(0.250-28)-01	600037.01	0.250-28	0.500	Low capacity load cell	25-300
CA-1-(0.625-18)-01	600037.06	0.625-18	0.625	Shear web	300-10,000
CA-1-(1.250-12)-01	600037.08	1.250-12	0.750	Shear web	20,000-50,000
CA-1-(1.500-12)-01	600037.12	1.500-12	0.750	Shear web	60,000
CA-1-(1.750-12)-01	600037.09	1.750-12	0.750	Shear web	70,000-110,000

Commonly Stocked

Part No.	Original Part No.	Thread	A
CA-1-(0.250-28)-01	600037.01	0.250-28	0.500
CA-1-(0.375-16)-02 (for button LC adapter)	-	0.375-16	0.375
CA-1-(0.500-20)-01	600037.03	0.500-20	0.625
CA-1-(0.625-18)-01	600037.06	0.625-18	0.625
CA-1-(0.750-16)-01	600037.07	0.750-16	0.625
CA-1-(0.875-14)-01	600037.21	0.875-14	0.750
CA-1-(1.000-14)-01	600037.04	1-14	0.750
CA-1-(1.250-12)-01	600037.08	1.250-12	0.750
CA-1-(1.500-12)-01	600037.12	1.500-12	0.750
CA-1-(1.750-12)-01	600037.09	1.750-12	0.750
CA-1-(M12x1.0)-01	600037.28	M12x1	0.625
CA-1-(M16x1.5)-01	600037.29	M16x1.5	0.750
CA-1-(M16x2.0)-01	600037.36	M16x2	0.625
CA-1-(M20x1.5)-01	600037.23	M20x1.5	1.000



Adapters with other thread sizes are available. Contact Morehouse for more information.

Spherical Load Button (CB)



Spherical Load Button - wrench flat (CB-1)

A spherical load button threads into the reference standard load cell and connects to the top compression alignment block (CG-1) to align the reference standard. It provides consistent loading for instruments requiring shoulder load.



Spherical Load Button - spanner holes (CB-2)

A spherical load button threads into the reference standard load cell and connects to the top compression alignment block (CG-1) to align the reference standard. It provides consistent loading for instruments requiring shoulder load. The spanner holes allow for easy removal.

Adapters for Morehouse Load Cells

Part No.	Original Part No.	Thread	Load Cell Type	Load Cell Capacity (lbf)
CB-1-(0.250-28)-01	600032.02	0.250-28	Low capacity load cell	25-300
CB-1-(0.625-18)-01	600032.05	0.625-18	Shear web	300-10,000
CB-1-(1.250-12)-01	600032.28	1.250-12	Shear web	20,000-50,000
CB-2-(1.500-12)-01	600032.55	1.500-12	Shear web	60,000
CB-2-(1.750-12)-01	600032.10	1.750-12	Shear web	70,000-110,000



Shear Web Load Cell with Integral Adapter

A shear web load cell is very susceptible to varying thread engagement. The Morehouse shear web load cell with integral adapter eliminates this error. For users who have height restrictions, we recommend a spherical load button adapter for a shear web load cell. However, results will not be as good as they would be with an integral threaded adapter.

Adapters with other thread sizes are available. Contact Morehouse for more information.

Load Ball Adapter (CCE-1)



The load ball adapter threads onto the load cell to provide alignment. It can be used for the reference standard or unit under test.

Adapters for Morehouse Load Cells

Part No.	Original Part No.	Sleeve Thread	Ball Dia.	Capacity (lbf)	Load Cell Type	Load Cell Capacity (lbf)
CCE-1-(0.625-18)-01	600082-02	0.625-18 UNF-2B	0.375	10,000	Shear web	300-10,000
CCE-1-(1.250-12)-01	600082-03	1.250-12 UNF-2B	0.625	60,000	Shear web	20,000-50,000
CCE-1-(1.500-12)-01	600082-15	1.500-12 UNF-2B	0.625	60,000	Shear web	60,000
CCE-1-(1.750-12)-01	600082-04	1.750-12 UN-2B	0.875	100,000	Shear web	70,000-110,000

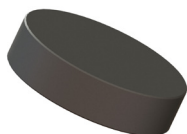
Commonly Stocked

Part No.	Original Part No.	Sleeve Thread	Ball Dia.	Capacity (lbf)
CCE-1-(0.500-20)-01	600082-01	0.500-20 UNF-2B	0.313	2,000
CCE-1-(0.750-16)-01	600082-17	0.750-16 UNF-2B	0.375	12,000
CCE-1-(1.000-14)-01	600082-11	1.000-14 UNS-2B	0.438	25,000
CCE-1-(M16X1.5)-01	600082-05	M16 x 1.5 6H	0.375	5,000
CCE-1-(M16X2)-01	600082-12	M16 x 2.0 6H	0.375	12,000
CCE-1-(M20X1.5)-01	600082-06	M20 x 1.5 6H	0.375	12,000

Adapters with other thread sizes are available. Contact Morehouse for more information.



Load Pad (CF-1)

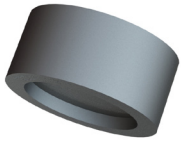


A load pad protects a load cell and contact area from deformation. It can be used with the bearing block (UC-xxx-53) to connect to the upper platen.

Part No.	Ø O.D.	Thk.	Max. Capacity (lbf)
CF-1-1.000-01	1.000	0.500	5,000
CF-1-4.000-01	4.000	1.500	300,000
CF-1-4.000-02	4.000	2.000	600,000

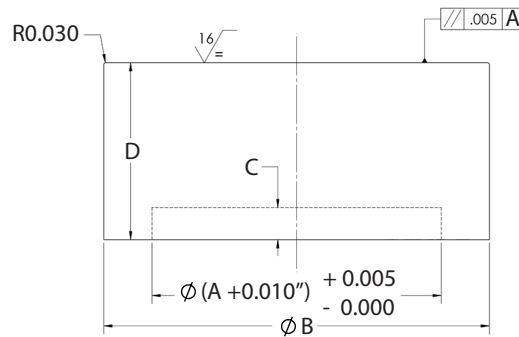


Top Compression Alignment Block - straight edge (CG-1)



This adapter can be used with any load cell terminating with a compression load button. It can be used with a spherical load button (CB-1, CB-2, CB-3, CB-5) to align the reference standard.

Part No.	Original Part No.	Ø "A"	Ø "B"	"C"	"D"	Max. Capacity (lbf)	Load Cell Type	Load Cell Capacity (lbf)
CG-1-2.000-02	600033.37	2.000	2.50	0.250	1.250	100,000	Mini load cell	60,000
CG-1-3.130-01	---	3.130	4.00	0.250	1.750	300,000	High capacity multi-column	200,000 and 300,000
CG-1-3.700-01	600033.34	3.700	5.00	0.375	2.500	600,000	High capacity multi-column	500,000
CG-1-4.110-01	---	4.110	4.50	0.250	2.000	600,000	Mini load cell	600,000



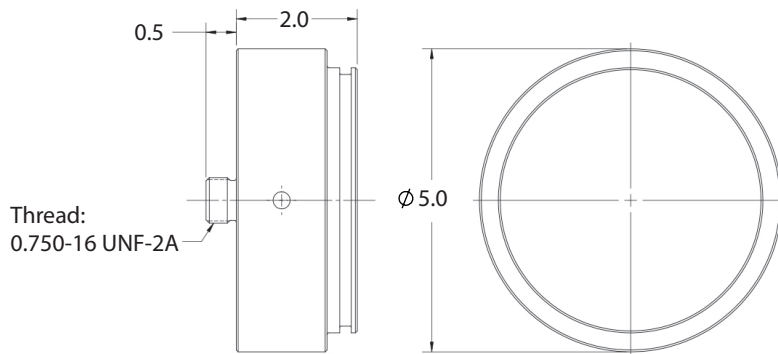
Errors associated with different hardness of material can be as high as 0.5 % of applied force. Morehouse has made top compression alignment blocks for more than fifty different varieties of load cells. Contact us for more information.

Top Compression Alignment Block (CG-10)



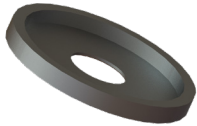
This adapter can be used with any load cell terminating with a compression load button. It can be used with a spherical load button (CB-1, CB-2, CB-3, CB-5) to align the unit under test or reference standard. It has an adjustable design that accommodates various upper alignment bushing plates (CG-15) for different diameter load cells

Part No.	Ø O.D.	Thread	Max. Capacity (lbf)
CG-10-5.000-(0.750-16)-01	5.000	0.750-16 UNF-2A	600,000





Upper Alignment Bushing Plate (CG-15)

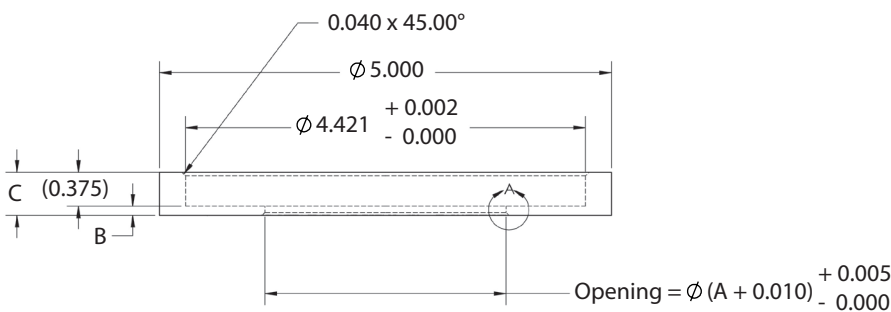


A bushing plate is used with the top compression alignment block (CG-10) to adjust to different diameter load cells.

Part No.	Ø A ¹	'B' THK.	'C'
CG-15-5.000-0.750-01	0.750	0.375	0.750
CG-15-5.000-0.875-01	0.875	0.375	0.750
CG-15-5.000-1.313-01	1.313	0.375	0.750
CG-15-5.000-1.500-01	1.500	0.375	0.750
CG-15-5.000-2.250-01	2.250	0.375	0.750
CG-15-5.000-3.000-01	3.000	0.375	0.750
CG-15-5.000-100mm-01	100mm	0.375	0.750

All dimensions are in inches unless otherwise noted.

¹ Ø A = Ø (O.D.) of instrument under test (UUT)





L-Bracket (CL)



The L-Brackets are designed to calibrate hand-held force gauges in a Portable Calibrating Machine. Use in other machines requires supporting adapters. The L-Bracket kit (PCM-L-BRKT-KIT) includes back plates, base plates, and threaded adapters to mount various models of hand-held force gauges. Each back plate can be mounted to any base plate to make different combinations. Each back plate is designed with special hole patterns to accommodate various types of hand-held force gauges.

PCM-L-BRKT-KIT

Base plate part no.	Offset	Plate width
CL-1B-0.3750	0.3750" (9.5 mm)	1.50
CL-1B-0.4200	0.4200" (10.7 mm)	1.50
CL-1B-0.4700	0.4700" (12.0 mm)	1.50
CL-1B-0.5000	0.5000" (12.7 mm)	1.50
CL-1B-0.5100	0.5100" (13 mm)	1.50
CL-1B-0.5433	0.5433" (13.8 mm)	1.50
CL-1B-0.5625	0.5625"	1.50
CL-1B-0.6850	0.6850" (17.3 mm) (17.4 mm), (17.5 mm)	1.50
CL-1B-0.7500	0.750"	1.50
CL-1B-0.7812	0.7812" (19.8 mm)	1.50
CL-1B-0.8500	0.8500" (21.6 mm)	1.50
CL-1B-0.9252	0.9252" (23.5 mm)	1.50
CL-1B-0.9800	0.9800" (25.0 mm)	1.50
CL-1B-1.0000	1.000"	1.50
CL-1B-1.1875	1.1875"	2.00
CL-1B-1.5000	1.500"	2.00
CL-1B-1.8750	1.875"	2.00

Back plate	Part no.
A	CL-1T-01
B1	CL-1T-02
C	CL-1T-03
D	CL-1T-04

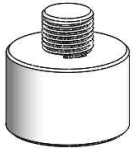
PCM top adapters
TA-PTF (#10-32)
TA-PTF (M4x0.7)
TA-PTF (0.3125-18)
TA-PTF (M6x1.0)
TA-PTF (M10x1.5)

The L-Bracket adapters support hand-held force gauges manufactured by:

- Ametek
- Chatillon
- Imada
- Mark 10
- Morehouse
- Shimpo

See manufacturer documentation for proper instrument mounting. Some instruments may require mounting with a dowel pin. For more details about L-Bracket adapters and the hand-held force gauge models supported, see [Portable Calibrating Machine Guide PG-5401](#).

Mounting Adapter (PC-2-054)



A mounting adapter is included with each machine, which accommodates a Morehouse shear web load cell. For low capacity load cells (300 lbf and under) the mounting adapter PC-2-054-03 is available. The mounting adapter is threaded to the top of the jack from one side. The top side of the adapter with external thread is then used to install the reference standard. Other thread sizes are available to mount other types of load cell.

Part No.	Thread	Included with PCM
PC-2-054-01	0.625-18	PCM-2MD-02
PC-2-054-03	0.250-28	PCM-2MD-04



Shear Web Load Cell



Low Capacity Load Cell



Tension Member Assembly (TMA)



One tension member is installed on the lower yoke platen and one on the lower fixed platen. The built-in self-alignment features of the tension member assembly automatically align the applied force to the appropriate force line of the instrument.

Recommended TMA for common machines and capacities

Part Number: TMA-C-TR-TB

C represents the capacity of the tension member in klbf. TR represents the length of the tension rod in inches. TB represents the diameter of the hole where the tension rod passes through. For a UCM, this hole is in the center of the lower yoke platen.

Machine	Tension Member Capacity	TR Part No.	TB Part No.	TMA Part No.
UCM-10K	12,000 lbf	TR-12-4	TB-12-1.000	TMA-12-4-1.000
UCM-30K	12,000 lbf	TR-12-4	TB-12-1.000	TMA-12-4-1.000
UCM-30K	30,000 lbf	TR-30-4.5	TB-30-1.000	TMA-30-4.5-1.000
UCM-60K	12,000 lbf	TR-12-4.5	TB-12-1.188	TMA-12-4.5-1.188
UCM-60K	30,000 lbf	TR-30-5.5	TB-30-1.188	TMA-30-5.5-1.188
UCM-60K	60,000 lbf	TR-60-5.5	TB-60-1.188	TMA-60-5.5-1.188
UCM-100K	30,000 lbf	TR-30-6	TB-30-1.563	TMA-30-6-1.563
UCM-100K	60,000 lbf	TR-60-6.5	TB-60-1.563	TMA-60-6.5-1.563
UCM-100K	120,000 lbf	TR-120-7.5	TB-120-1.563	TMA-120-7.5-1.563

Examples:

TMA-12-4-1.000: Tension member with a 12,000 lbf capacity, 4 inch tension rod, and 1 inch diameter hole for the tension rod.

TMA-60-5.5-1.188: Tension member with a 60,000 lbf capacity, 5.5 inch tension rod, and 1.188 inch diameter hole for the tension rod.

Tension Adapter Value Kits that includes the Tension Member Assembly and common size adapters needed for calibration are available. For more details:

[30k Tension Adapter Value Kit](#)

[60k Tension Adapter Value Kit](#)

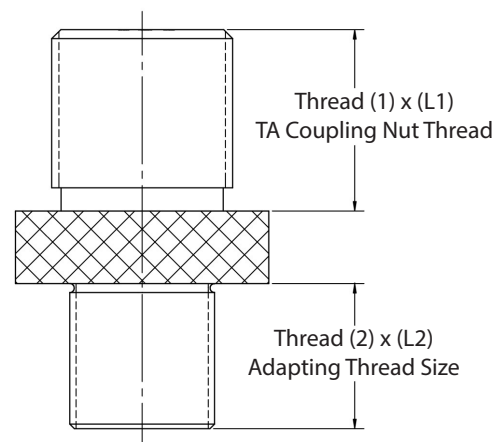
[120k Tension Adapter Value Kit](#)

Male Threaded Adapter (TA-M)



The tension member assembly (TMA) connects the machine to other force-measuring instruments using this male threaded adapter.

Adapting Thread - Side of Adapter			
Part No. ¹	Thread (2) Adapting Thread	(L2) Thread Length	Thread Capacity (lbf)
TA-yyM(#6-32)	#6-32 UNC-2A	0.188	400
TA-yyM(#10-32)	#10-32 UNF-2A	0.188	900
TA-yyM(0.250-20)	0.250-20 UNC-2A	0.250	1,500
TA-yyM(0.250-28)	0.250-28 UNF-2A	0.250	1,800
TA-yyM(0.313-18)	0.313-18 UNC-2A	0.3125	2,700
TA-yyM(0.313-24)	0.313-24 UNF-2A	0.3125	3,000
TA-yyM(0.375-16)	0.375-16 UNC-2A	0.375	3,700
TA-yyM(0.375-24)	0.375-24 UNF-2A	0.375	4,000
TA-yyM(0.438-14)	0.438-14 UNC-2A	0.4375	5,000
TA-yyM(0.438-20)	0.438-20 UNF-2A	0.4375	6,000
TA-yyM(0.500-13)	0.500-13 UNC-2A	0.500	7,000
TA-yyM(0.500-20)	0.500-20 UNF-2A </td <td>0.500</td> <td>8,000</td>	0.500	8,000
TA-yyM(0.625-11)	0.625-11 UNC-2A	0.625	11,000
TA-yyM(0.625-18)	0.625-18 UNF-2A	0.625	12,000
TA-yyM(0.750-10)	0.750-10 UNC-2A	0.750	16,000
TA-yyM(0.750-16)	0.750-16 UNF-2A	0.750	18,000
TA-yyM(0.875-9)	0.875-9 UNC-2A	0.875	22,000
TA-yyM(0.875-14)	0.875-14 UNF-2A	0.875	25,000
TA-yyM(1.000-8)	1.000-8 UNC-2A	1.000	29,000
TA-yyM(1.000-12)	1.000-12 UNF-2A	1.000	32,000
TA-yyM(1.000-14)	1.000-14 UNS-2A	1.000	33,000
TA-yyM(1.125-12)	1.125-12 UNF-2A	1.125	42,000
TA-yyM(1.250-12)	1.250-12 UNF-2A	1.250	53,000
TA-yyM(1.375-12)	1.375-12 UNF-2A	1.375	65,000
TA-yyM(1.500-6)	1.500-6 2A	1.500	68,000
TA-yyM(1.500-12)	1.500-12 UNF-2A	1.500	78,000



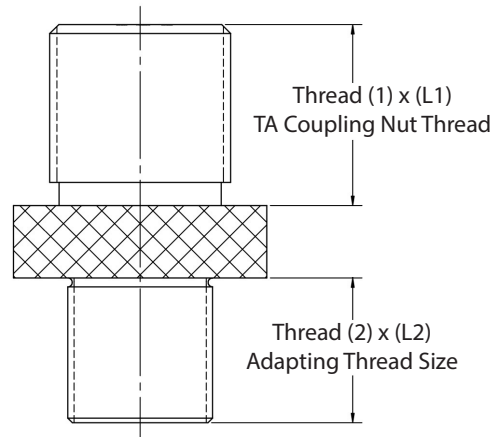
¹ yy = Capacity of the quick-change tension member (ex. 12, 30, 60, 90, 120).



Male Threaded Adapter (TA-M) - continued

Adapting Thread - Side of Adapter			
Part No. ¹	Thread (2) Adapting Thread	(L2) Thread Length	Thread Capacity (lbf)
TA-yyM(1.750-12)	1.750-12 UN-2A	1.750	108,000
TA-yyM(2.000-8)	2.000-8 UN-2A	2.000	136,000
TA-yyM(2.000-12)	2.000-12 UN-2A	2.000	143,000
TA-yy-(2.125-12)	2.125-12 UN-2A	2.125	162,000
TA-yyM(2.250-12)	2.250-12 UN-2A	2.250	183,000
TA-yyM(2.375-12)	2.375-12 UN-2A	2.375	210,000
TA-yyM(2.500-12)	2.500-12 UN-2A	2.500	228,000
TA-yyM(2.750-8)	2.750-8 UN-2A	2.750	270,000

¹ yy = Capacity of the quick-change tension member (ex. 12, 30, 60, 90, 120).



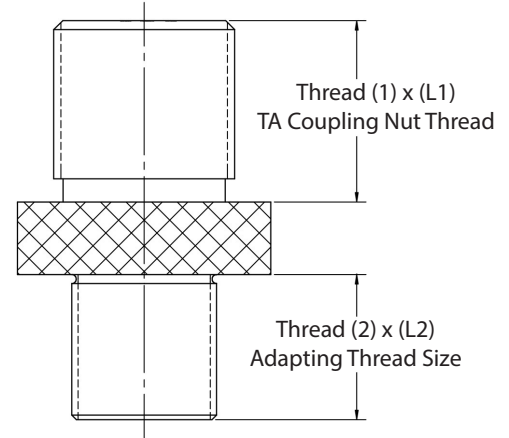
Coupling Nut Thread - Side of Adapter			
Part No. ¹	Thread (1) Coupling Nut Thread	(L1) Thread Length	Thread Capacity (lbf)
TA-0.5M(xxx)	0.500-13 UNC-2A	0.375	500
TA-12M(xxx)	1.125-12 UNC-2A	0.750"	12,000
TA-30M(xxx)	1.25-12 UNF-2A	1.250"	30,000
TA-60M(xxx)	1.5-12 UNF-2A	1.250"	60,000
TA-120M(xxx)	2-12 UN-2A	1.750"	120,000

¹ (xxx) = Adapter thread call out (ex. 0.25-20)



Male Threaded Adapter (TA-M) - continued

Adapting Thread - Side of Adapter			
Part No. ¹	Thread (2) Adapting Thread	(L2) Thread Length	Thread Capacity (lbf)
TA-yyM(M3x0.5)	M3x0.5 4g6g	0.125	400
TA-yyM(M4x0.7)	M4x0.7 4g6g	0.1875	700
TA-yyM(M5x0.8)	M5x0.8 4g6g	0.25	1,100
TA-yyM(M6x1)	M6x1 4g6g	0.25	1,600
TA-yyM(M8x1.25)	M8x1.25 4g6g	0.375	2,800
TA-yyM(M10x1.5)	M10x1.5 4g6g	0.4375	4,500
TA-yyM(M12x1.25)	M12x1.25 4g6g	0.50	7,100
TA-yyM(M12x1.75)	M12x1.75 4g6g	0.50	6,500
TA-yyM(M14x2)	M14x2 4g6g	0.625	9,000
TA-yyM(M16x1.5)	M16x1.5 4g6g	0.6875	13,000
TA-yyM(M16x2)	M16x2 4g6g	0.6875	12,000
TA-yyM(M20x1.5)	M20x1.5 4g6g	0.8125	20,000
TA-yyM(M20x1.5)-2	M20x1.5 4g6g	1.100	20,000
TA-yyM(M20x2.5)	M20x2.5 4g6g	0.8125	19,000
TA-yyM(M22x2.5)	M22x2.5 4g6g	0.875	23,000
TA-yyM(M24x1.5)	M24x1.5 4g6g	1.00	29,000
TA-yyM(M24x2)	M24x2 4g6g	1.00	29,000
TA-yyM(M24x3)	M24x3 4g6g	1.00	27,000
TA-yyM(M27x2)	M27x2 4g6g	1.063	38,000
TA-yyM(M30x3.5)	M30x3.5 4g6g	1.25	43,000
TA-yyM(M32x2)	M32x2 4g6g	1.313	54,000
TA-yyM(M33x2)	M33x2 4g6g	1.313	58,000
TA-yyM(M36x2)	M36x2 4g6g	1.4375	64,000
TA-yyM(M36x4)	M36x4 4g6g	1.4375	64,000
TA-yyM(M39x2)	M39x2 4g6g	1.563	84,000
TA-yyM(M40x1.5)	M40x1.5 4g6g	1.625	91,000
TA-yyM(M42x2.0)	M42x2.0 4g6g	1.688	97,000
TA-yyM(M72x4)	M72x4 4g6g	2.875	284,000



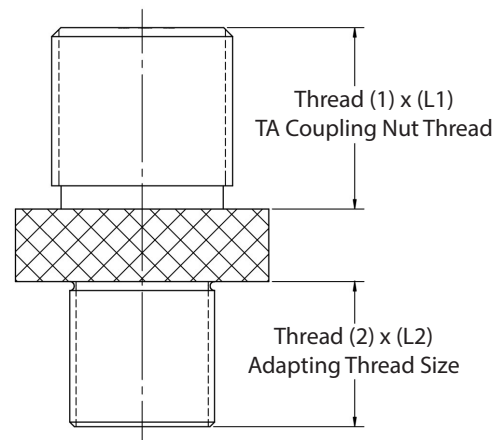
¹ yy = Capacity of the quick-change tension member (ex. 12, 30, 60, 90, 120).



Male Threaded Adapter (TA-M) - continued

Coupling Nut Thread - Side of Adapter			
Part No. ¹	Thread (1) Coupling Nut Thread	(L1) Thread Length	Thread Capacity (lbf)
TA-0.5M(xxx)	0.500-13 UNC-2A	0.375	500
TA-12M(xxx)	1.125-12 UNC-2A	0.750"	12,000
TA-30M(xxx)	1.25-12 UNF-2A	1.250"	30,000
TA-60M(xxx)	1.5-12 UNF-2A	1.250"	60,000
TA-120M(xxx)	2-12 UN-2A	1.750"	120,000

¹ (xxx) = Adapter thread call out (ex. 0.25-20)





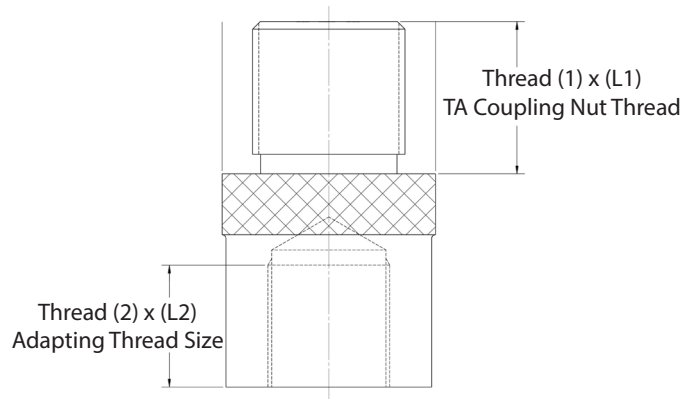
Female Threaded Adapter (TA-F)

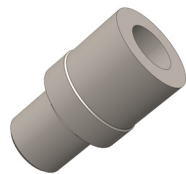


The tension member connects the machine to other force-measuring instruments using this female threaded adapter.

Adapting Thread - Side of Adapter			
Part No. ¹	Thread (2) Adapting Thread	(L2) Thread Length	Thread Capacity (lbf)
TA-yyF(#6-32)	#6-32 UNC-2B	0.188	400
TA-yy(#10-32)	#10-32 UNF-2B	0.188	900
TA-yyF(0.250-20)	0.250-20 UNC-2B	0.250	1,500
TA-yyF(0.250-28)	0.250-28 UNF-2B	0.250	1,800
TA-yyF(0.313-18)	0.313-18 UNC-2B	0.3125	2,700
TA-yyF(0.313-24)	0.313-24 UNF-2B	0.3125	3,000
TA-yyF(0.375-16)	0.375-16 UNC-2B	0.375	3,700
TA-yyF(0.375-24)	0.375-24 UNF-2B	0.375	4,000
TA-yyF(0.438-14)	0.438-14 UNC-2B	0.4375	5,000
TA-yyF(0.438-20)	0.438-20 UNF-2B	0.4375	6,000
TA-yyF(0.500-13)	0.500-13 UNC-2B	0.5	7,000
TA-yyF(0.500-20)	0.500-20 UNF-2B	0.5	8,000
TA-yyF(0.625-11)	0.625-11 UNC-2B	0.625	11,000
TA-yyF(0.625-18)	0.625-18 UNF-2B	0.625	12,000
TA-yyF(0.750-10)	0.750-10 UNC-2B	0.75	16,000
TA-yyF(0.750-16)	0.750-16 UNF-2B	0.75	18,000
TA-yyF(0.875-9)	0.875-9 UNC-2B	0.875	22,000
TA-yyF(0.875-14)	0.875-14 UNF-2B	0.875	25,000
TA-yyF(1.000-8)	1.000-8 UNC-2B	1.0	29,000
TA-yyF(1.000-12)	1.000-12 UNF-2B	1.0	32,000
TA-yyF(1.000-14)	1.000-14 UNS-2B	1.0	33,000
TA-yyF(1.000-14LH)	1.000-14 UNS-2B (Left-Hand Thread)	1.0	33,000
TA-yyF(1.125-12)	1.125-12 UNF-2B	1.125	42,000
TA-yyF(1.250-12)	1.250-12 UNF-2B	1.25	53,000
TA-yyF(1.375-12)	1.375-12 UNF-2B	1.375	65,000
TA-yyF(1.500-6)	1.500-6 2B	1.500	68,000

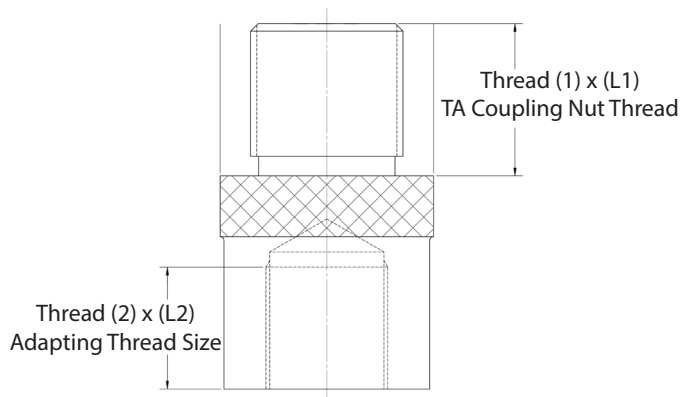
¹ yy = Capacity of the quick-change tension member (ex. 12, 30, 60, 90, 120).





Female Threaded Adapter (TA-F) - continued

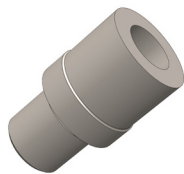
Adapting Thread - Side of Adapter			
Part No. ¹	Thread (2) Adapting Thread	(L2) Thread Length	Thread Capacity (lbf)
TA-yyF(1.500-12)	1.500-12 UNF-2B	1.500	78,000
TA-yyF(1.750-12)	1.750-12 UN-2B	1.750	108,000
TA-yyF(2.000-8)	2.000-8 UN-2B	2.000	136,000
TA-yyF(2.000-12)	2.000-12 UN-2B	2.000	143,000
TA-yyF(2.250-12)	2.250-12 UN-2B	2.250	183,000
TA-yyF(2.500-12)	2.500-12 UN-2B	2.500	228,000



¹ yy = Capacity of the quick-change tension member (ex. 12, 30, 60, 90, 120).

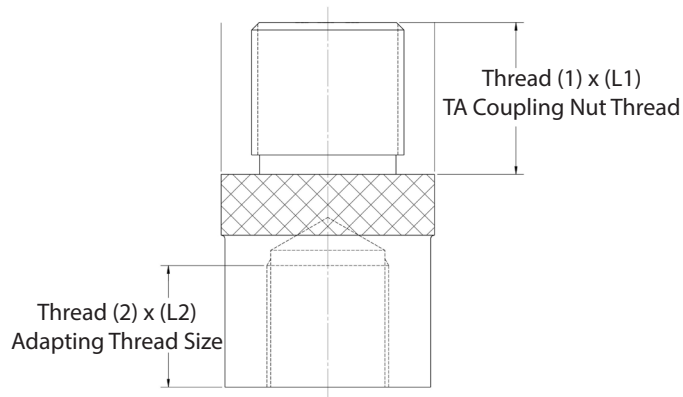
Coupling Nut Thread - Side of Adapter			
Part No. ¹	Thread (1) Coupling Nut Thread	(L1) Thread Length	Thread Capacity (lbf)
TA-0.5F(xxx)	0.500-13 UNC-2A	0.375	500
TA-12F(xxx)	1.125-12 UNC-2A	0.750"	12,000
TA-30F(xxx)	1.25-12 UNF-2A	1.250"	30,000
TA-60F(xxx)	1.5-12 UNF-2A	1.250"	60,000
TA-120F(xxx)	2-12 UN-2A	1.750"	120,000

¹ (xxx) = Adapter thread call out (ex. 0.25-20)

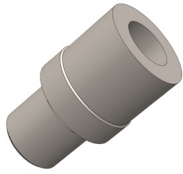


Female Threaded Adapter (TA-F) - continued

Adapting Thread - Side of Adapter			
Part No. ¹	Thread (2) Adapting Thread	(L2) Thread Length	Thread Capacity (lbf)
TA-yyF(M3x0.5)	M3x0.5 4g6g	0.125	400
TA-yyF(M4x0.7)	M4x0.7 4g6g	0.1875	700
TA-yyF(M5x0.8)	M5x0.8 4g6g	0.25	1,100
TA-yyF(M6x1)	M6x1 4g6g	0.25	1,600
TA-yyF(M8x1.25)	M8x1.25 4g6g	0.375	2,800
TA-yyF(M10x1.5)	M10x1.5 4g6g	0.4375	4,500
TA-yyF(M12x1.25)	M12x1.25 4g6g	0.50	7,100
TA-yyF(M12x1.75)	M12x1.75 4g6g	0.50	6,500
TA-yyF(M14x2)	M14x2 4g6g	0.625	9,000
TA-yyF(M16x1.5)	M16x1.5 4g6g	0.6875	13,000
TA-yyF(M16x2)	M16x2 4g6g	0.6875	12,000
TA-yyF(M20x2.5)	M20x2.5 4g6g	0.8125	19,000
TA-yyF(M22x2.5)	M22x2.5 4g6g	0.875	23,000
TA-yyF(M24x3)	M24x3 4g6g	1.00	27,000
TA-yyF(M30x3.5)	M30x3.5 4g6g	1.25	43,000
TA-yyF(M32x2)	M32x2 4g6g	1.250	54,000
TA-yyF(M33x2)	M33x2 4g6g	1.375	58,000
TA-yyF(M36x4)	M36x4 4g6g	1.4375	64,000
TA-yyF(M39x2)	M39x2 4g6g	1.563	84,000
TA-yyF(M42x2)	M42x2 4g6g	1.688	97,000
TA-yyF(M42x3)	M42x3 4g6g	1.688	92,000
TA-yyF(M45x3)	M45x3 4g6g	1.750	107,000
TA-yyF(M72x4)	M72x4 4g6g	2.875	172,000



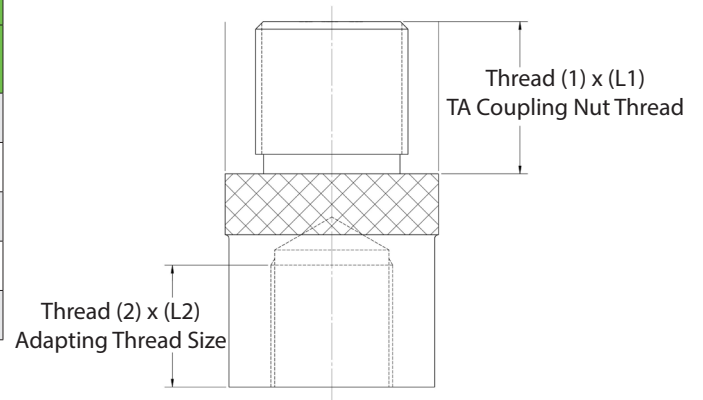
¹ yy = Capacity of the quick-change tension member (ex. 12, 30, 60, 90, 120).



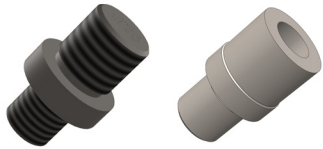
Female Threaded Adapter (TA-F) - continued

Coupling Nut Thread - Side of Adapter			
Part No. ¹	Thread (1) Coupling Nut Thread	(L1) Thread Length	Thread Capacity (lbf)
TA-0.5F(xxx)	0.500-13 UNC-2A	0.375	500
TA-12F(xxx)	1.125-12 UNC-2A	0.750"	12,000
TA-30F(xxx)	1.25-12 UNF-2A	1.250"	30,000
TA-60F(xxx)	1.5-12 UNF-2A	1.250"	60,000
TA-120F(xxx)	2-12 UN-2A	1.750"	120,000

¹ (xxx) = Adapter thread call out (ex. 0.25-20)



PCM Threaded Adapter (TA-PTM, TM-PTF, TM-PBM, TA-PBF)



These male and female threaded adapters connect the top of the unit under test to the Portable Calibrating Machine (PCM) and the bottom of the unit under test to a Morehouse shear web reference standard load cell. The Tension Adapter Kit (PCM-TA-KIT) includes the adapters needed for most force instruments available in the market within the 2,000 lbf capacity range.

PCM-TA-KIT

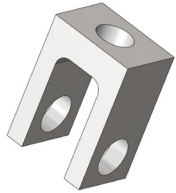
UUT Top Adapter			
Part no.	Machine Thread	Adapter Thread	Capacity (lbf)
TA-PTM (0.250-28)	1.125-12	0.250-28	1,800
TA-PTM (0.500-13)	1.125-12	0.500-13	7,000
TA-PTM (0.500-20)	1.125-12	0.500-20	8,000
TA-PTM (0.625-18)	1.125-12	0.625-18	12,000
TA-PTF (0.250-28)	1.125-12	0.250-28	1,800
TA-PTF (0.500-13)	1.125-12	0.500-13	1,800
TA-PTF (0.500-20)	1.125-12	0.500-20	1,800
TA-PTF (0.625-18)	1.125-12	0.625-18	1,800

UUT Bottom Adapter			
Part no.	Reference Standard Thread	Adapter Thread	Capacity (lbf)
TA-PBM (0.250-28)	0.625-18	0.250-28	1,800
TA-PBM (0.500-13)	0.625-18	0.500-13	7,000
TA-PBM (0.500-20)	0.625-18	0.500-20	8,000
TA-PBM (0.625-18)	0.625-18	0.625-18	12,000
TA-PBF (0.250-28)	0.625-18	0.250-28	1,800
TA-PBF (0.500-13)	0.625-18	0.500-13	1,800
TA-PBF (0.500-20)	0.625-18	0.500-20	1,800
TA-PBF (0.625-18)	0.625-18	0.625-18	1,800

For more details about the Tension Adapter Kit, see [Portable Calibrating Machine Guide PG-5401](#).



Clevis (TU)



A clevis is attached to a Tension Member Assembly (TMA) through the retaining ring after removing the coupling nut or with an intermediate threaded adapter, which attaches to the coupling nut.

Clevis Capacity (lbf)	TU Part No.
12,000	TU-12-001
30,000	TU-30-001
60,000	TU-60-001
120,000	TU-120-001

The Clevis is attached to a straight pin or shoulder pin with bushing. A set of two clevises and several pins will facilitate the calibration of numerous instruments. A Basic Kit and Premium Kit are available along with a list of instruments that can be calibrated.



Straight Pin (TP)

The straight pin is the standard pin for a clevis (TU). It is designed and manufactured to fit the side holes on the clevis.



Shoulder Pin Assembly (TUZ)

The clevis shoulder pin can be used with the clevis (TU) instead of the straight pin (TP). It includes a bushing and is often used to generate pin sizes with smaller diameters than the straight pin.

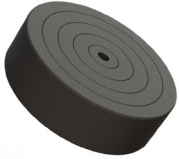
Clevis Capacity (lbf)	Clevis Kit	Kit Type	For Kit Details
12,000	CL-12K-BKIT	Basic	PD-5904
12,000	CL-12K-PKIT	Premium	PD-5904
30,000	CL-30K-BKIT	Basic	PD-5905
30,000	CL-30K-PKIT	Premium	PD-5905
60,000	CL-60K-BKIT	Basic	PD-5906
60,000	CL-60K-PKIT	Premium	PD-5906
120,000	CL-120K-BKIT	Basic	PD-5907
120,000	CL-120K-PKIT	Premium	PD-5907

Clevis kits can be used for instruments from:

- Canflex
- CAS
- Chatillon
- Dillon
- Eilon
- IMES
- Intercomp
- LSI
- Rice Lake
- Straightpoint
- Strainert
- Tractel

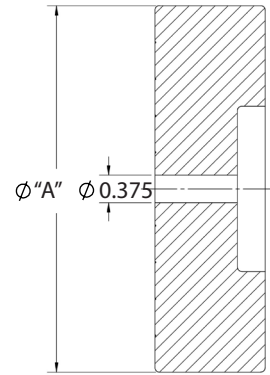


Jack Compression Block (UC-xxx-50)



The jack compression block is used for the reference standard and sets into to the hydraulic jack. The alignment plug (CA) sets into the block. xxx in the part number designates the Universal Calibrating Machine capacity.

UCM Size	Part No.	Ø "A"	Capacity (lbf)
10k	UC-10-050-01	2.50	10,000
30k	UC-30-050-01	4.00	30,000
60k & 100k	UC-100-050-01	5.00	100,000
200k	UC-200-050-01	6.50	200,000
300k	UC-300-050-01	7.50	300,000



If you want to decrease your compression area, Morehouse can provide jack extension blocks for the reference standard.



Ball Seat Adapter (UC-xxx-51)

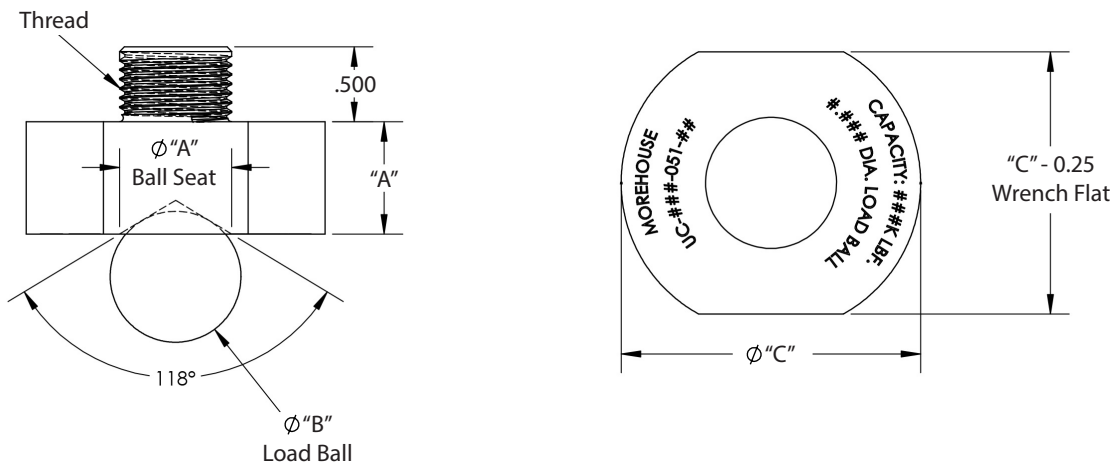


One threads into the upper yoke platen for the reference standard and one threads into the upper fixed platen for the unit under test. The sleeve ball adapter (CCE-1) connects to the bottom of each. xxx in the part number designates the Universal Calibrating Machine capacity.

UCM Size	Part No.	Max. Capacity (lbf)	Thread	"A" & ϕ "A"	ϕ "B"	ϕ "C"
10k & 30k	UC-30-051-01	30,000	0.500-13 UNC-2A	0.375	0.4375	1.500
10k & 30k	UC-30-051-02	60,000	0.500-13 UNC-2A	0.500	0.625	1.500
10k & 30k	UC-30-051-03	100,000	0.500-13 UNC-2A	0.750	0.875	2.000
60k & 100k	UC-100-051-01	100,000	0.750-16 UNF-2A	0.750	0.875	2.000
60k & 100k	UC-100-051-02	60,000	0.750-16 UNF-2A	0.500	0.625	1.625
60k & 100k	UC-100-051-03	30,000	0.750-16 UNF-2A	0.375	0.4375	1.500
60k & 100k	UC-100-051-04	150,000	0.750-16 UNF-2A	1.000	1.250	2.750
60k & 100k	UC-100-051-09	200,000	0.750-16 UNF-2A	1.000	1.500	2.750

Notes

1. Capacity is dependent on the steel load ball.
2. Do not load the threads. Load shall only be taken on the shoulder of the adapter.



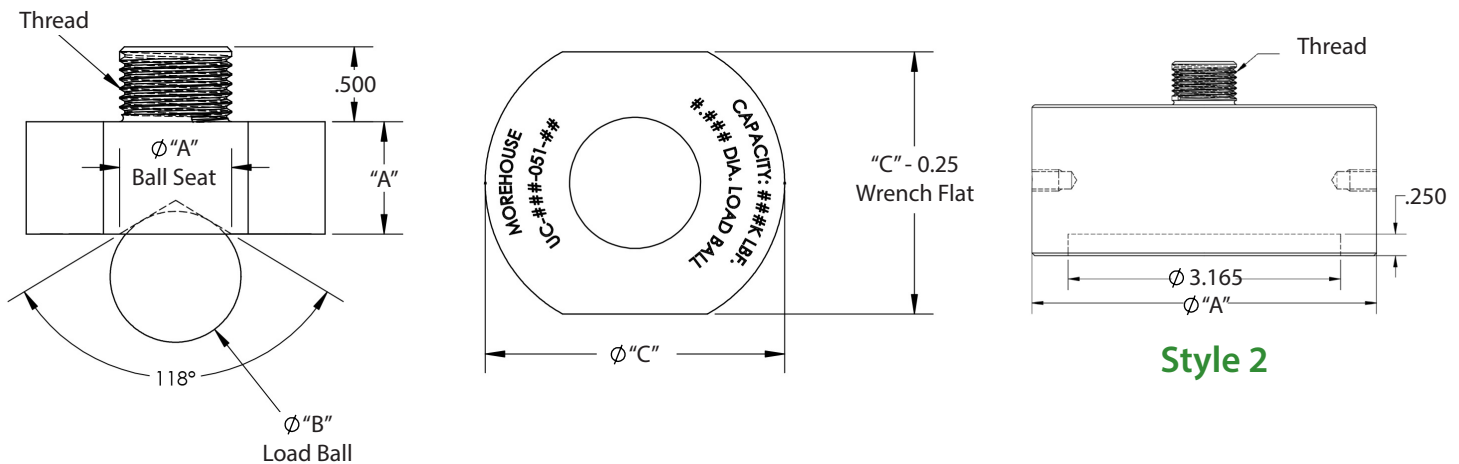


Ball Seat Adapter (UC-xxx-51) - continued

UCM Size	Part No.	Max. Capacity (lbf)	Thread	"A" & ϕ "A"	ϕ "B"	ϕ "C"	Weight (lbs)
200k	UC-200-051-01	200,000	0.750-16 UNF-2A	1.250	1.750	3.500	3.413
200k	UC-200-051-02	200,000	0.750-16 UNF-2A	1.000	1.500	2.750	1.699
200k	UC-200-051-03	150,000	0.750-16 UNF-2A	1.000	1.250	2.750	N/A
200k	UC-200-051-04	100,000	0.750-16 UNF-2A	0.750	0.875	2.000	0.697
200k	UC-200-051-05	75,000	0.750-16 UNF-2A	0.625	0.750	1.750	N/A
200k	UC-200-051-06	60,000	0.750-16 UNF-2A	0.500	0.625	1.625	0.337
300k	UC-300-051-01	300,000	0.750-16 UNF-2A	Style 2	NA	NA	5.8
300k	UC-300-051-02	300,000	0.750-16 UNF-2A	1.250	1.750	3.500	3.413
300k	UC-300-051-03	220,000	0.750-16 UNF-2A	1.000	1.500	2.750	1.699
300k	UC-300-051-04	150,000	0.750-16 UNF-2A	1.000	1.250	2.750	N/A
300k	UC-300-051-05	100,000	0.750-16 UNF-2A	0.750	0.875	2.000	0.697
300k	UC-300-051-06	75,000	0.750-16 UNF-2A	0.625	0.750	1.750	N/A
300k	UC-300-051-07	60,000	0.750-16 UNF-2A	0.500	0.625	1.625	0.337

Notes

1. Capacity is dependent on the steel load ball.
2. Do not load the threads. Load shall only be taken on the shoulder of the adapter.



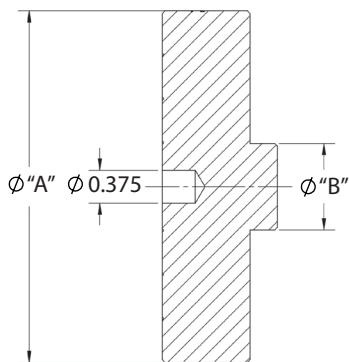
Style 2

UCM Lower Yoke Compression Block (UC-xxx-52)

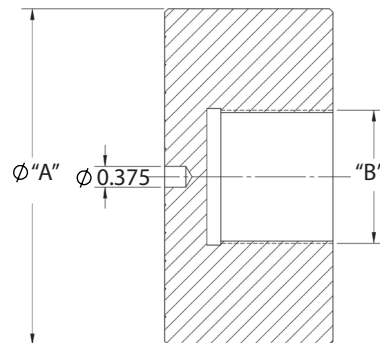


The lower yoke compression block ensures the unit under test setup is centered on the lower yoke platen and protects it from deformation. The alignment plug (CA) sets into the block. xxx in the part number designates the Universal Calibrating Machine capacity.

UCM Size	Part No.	Ø "A"	"B" or Ø "B"	Style	Weight (lbs)
10k	UC-10-052-01	4.00	0.985	1	3.7
30k	UC-30-052-01	4.00	0.985	1	3.7
60k	UC-60-052-01	5.00	1.17	1	7.2
100k	UC-100-052-01	5.00	1.555	1	7.24
200k	UC-200-052-01	6.00	2.375	2	21.7
300k	UC-300-052-01	8.00	2.875	2	60.1



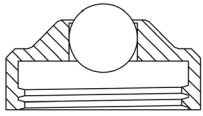
Style 1



Style 2



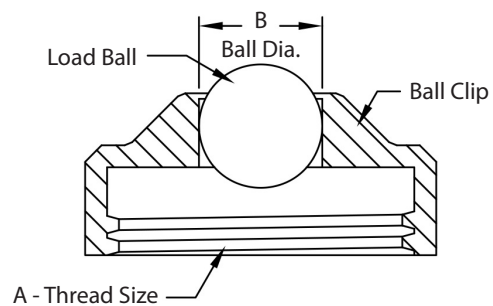
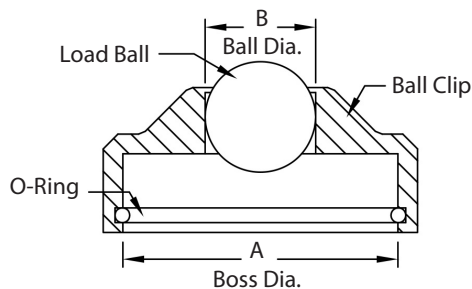
Proving Ring Ball Retainer Clip



All ball retainer clips are supplied with load balls. A proving ring boss must have a ball seat if a loading ball is to be used. See instructions supplied with the proving ring for dimensions of ball seats for proving rings. Advise serial number of proving ring when ordering retainer clips.

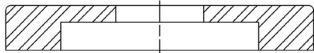
Without Threaded Bosses			
A - Boss Dia.	B - Ball Dia.	Capacity (lbf)	Catalog No.
5/8	3/8	3,000	600007.01
3/4	7/16	10,000	600007.02
7/8	7/16	12,000	600007.03
1	7/16	30,000	600007.04
1 1/4	7/16	6,000	600007.05
1 1/4	5/8	60,000	600007.08
1 5/16	7/16	30,000	600007.18
1 5/16	5/8	60,000	600007.09
1 1/2	7/16	12,000	600007.06
1 1/2	7/8	120,000	600007.11
1.571	7/8	120,000	600007.12
1 3/4	7/16	30,000	600007.07
1 3/4	7/8	120,000	600007.13
2	1 1/2	200,000	600007.15
2 1/4	5/8	60,000	600007.10
2.284	1 3/4	300,000	600007.16
2 1/2	1 1/2	120,000	600007.14
2 1/2	1 3/4	220,000	600007.17

With Threaded Bosses			
A - Thread Size	B - Ball Dia.	Capacity (lbf)	Catalog No.
3/4-12 WW	3/8	3,000	600008.01
1 1/8-9 WW	7/16	15,000	600008.02
1 1/2-8 WW	7/16	30,000	600008.13
1 1/2-8 WW	5/8	60,000	600008.05
1 3/4-7 WW	7/8	120,000	600008.06
1 1/8-12 UNF	7/16	30,000	600008.04
1 1/4-12 UNF	7/16	30,000	600008.03
1 3/8-12 UNF	7/16	30,000	600008.09
1 1/2-12 UNF	5/8	60,000	600008.12
1 3/4-12 UN	7/8	90,000	600008.14
2-4 1/2 UN	7/8	120,000	600008.10
2 1/4-4 1/2 UN	1 1/2	200,000	600008.11
2 1/4-5 UN	1 1/2	200,000	600008.07
2 1/2-4 UN	1 1/2	200,000	600008.08



Note: Load balls are made of hardened chrome alloy steel. Never use a carbide ball.

Proving Ring Alignment Bushing

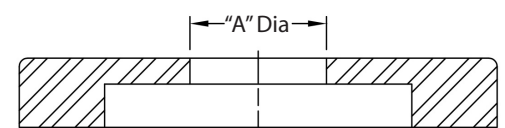


The proving ring alignment bushing aligns the proving ring with the jack.

UCM Size	'A' Dia.	Catalog No.
10k	5/8	604421.01
10k	3/4	604421.02
10k	7/8	604421.03
10k	1	604421.04
10k	1 5/64	604421.08
10k	1 1/8	604421.05
10k	1 1/4	604421.06
10k	1 1/2	604421.07
10k	1 25/32	604421.09
30k	5/8	604521.01
30k	3/4	604521.02
30k	7/8	604521.03
30k	1	604521.04
30k	1 5/64	604521.12
30k	1 1/8	604521.05
30k	1 1/4	604521.06
30k	1 1/4 SQ.	604521.14
30k	1 5/16	604521.07
30k	1 3/8	604521.08
30k	1 1/2	604521.09
30k	1 9/16	604521.10
30k	1 3/4	604521.11
30k	1 25/32	604521.13
60k	5/8	604621.01
60k	3/4	604621.02
60k	7/8	604621.03
60k	1	604621.04
60k	1 5/64	604621.14
60k	1 1/8	604621.05
60k	1 3/16	604621.16
60k	1 1/4	604621.06
60k	1 5/16	604621.07

UCM Size	'A' Dia.	Catalog No.
60k	1 3/8	604621.08
60k	1 1/2	604621.09
60k	1 9/16	604621.10
60k	1 3/4	604621.11
60k	1 25/32	604621.15
60k	2	604621.12
60k	2 1/4	604621.13
100k	5/8	604721.01
100k	3/4	604721.02
100k	7/8	604721.03
100k	1	604721.04
100k	1 5/64	604721.15
100k	1 1/8	604721.05
100k	1 1/4	604721.06
100k	1 5/16	604721.07
100k	1 3/8	604721.08
100k	1 1/2	604721.09
100k	1 9/16	604721.10
100k	1 3/4	604721.11
100k	1 25/32	604721.16
100k	2	604721.12
100k	2 1/4	604721.13
100k	2 1/2	604721.14
150k	5/8	604821.01
150k	3/4	604821.02
150k	7/8	604821.03
150k	1	604821.04
150k	1 5/64	604821.15
150k	1 1/8	604821.05
150k	1 1/4	604821.06
150k	1 5/16	604821.07
150k	1 3/8	604821.08

UCM Size	'A' Dia.	Catalog No.
150k	1 1/2	604821.09
150k	1 9/16	604821.10
150k	1 3/4	604821.11
150k	1 25/32	604821.16
150k	2	604821.12
150k	2 1/4	604821.13
150k	2 1/2	604821.14
200k	5/8	615321.01
200k	3/4	615321.02
200k	7/8	615321.03
200k	1	615321.04
200k	1 5/64	615321.15
200k	1 1/8	615321.05
200k	1 1/4	615321.06
200k	1 5/16	615321.07
200k	1 3/8	615321.08
200k	1 1/2	615321.09
200k	1 9/16	615321.10
200k	1 3/4	615321.11
200k	1 3/4 SQ.	615321.17
200k	1 25/32	615321.16
200k	2	615321.12
200k	2 1/4	615321.13
200k	2 1/4 SQ.	615321.18
200k	2 1/2	615321.14



Other Adapters

This application guide includes examples of typical calibration setups and the associated adapters. Not all Morehouse adapters are shown. Below are additional adapter examples. Contact Morehouse for more information on custom adapters to meet your specific requirements.



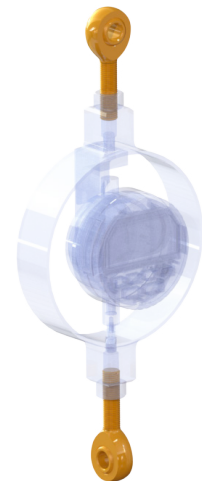
Rod Ends for Load Cells (TD-1)

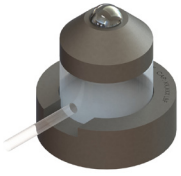
For load cells, a set of two rod ends can be used to measure tensile forces and help with tensile load line alignment.



Rod Ends for Force Ring Gauges (ZM)

For ring force gauges, a set of two rod ends can be used to measure tensile forces and help with tensile load line alignment.

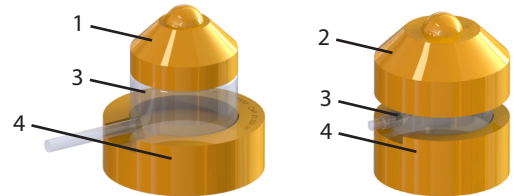




Miniature Load Cell Adapter Set (CPD)

This adapter set is designed for button load cell and washer load cell alignment. The set combines the miniature ball adapter for button load cell (CD-1) or miniature ball adapter for washer load cell (CD-2) with the miniature cell base adapter (CP). The adapter sets can be used for instruments from Cooper, Futek, Interface, Omega, and Transducer Techniques.

1. Miniature ball adapter for button load cell (CD-1)
2. Miniature ball adapter for washer load cell (CD-2)
3. Button or washer load cell
4. Miniature cell base adapter (CP)

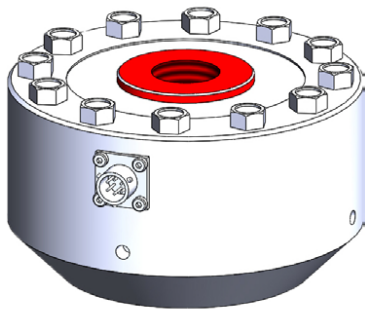


For more details, see [Miniature Button Load Cell Adapters PD-5911](#) or [Miniature Washer Load Cell Adapters PD-5912](#).

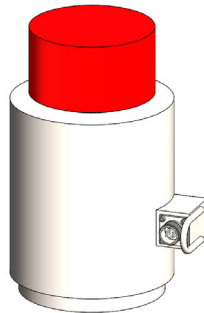
Adapters Reduce Measurement Error

Morehouse has created these adapters to standardize the calibration process, simplify setup, improve cycle time, reduce errors, and improve safety. The output of a force-measuring device can be significantly impacted by adapters, which poses serious safety concerns and can impact measurement uncertainty. Risk considerations include:

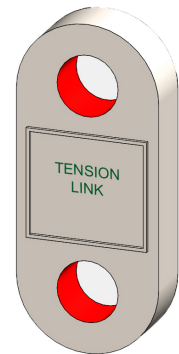
- Lifespan of old adapters
- Eccentric force and side loading
- Permanent material deformation
- Not using ISO 376 recommendations for tension loading
- Introducing unwanted bending or torsion
- Calibration setups that do not replicate the application such as:



Varying thread engagement



Varying hardness and flatness
of top adapters



Varying pin size

Best practice is to talk with the end user and replicate how they use the equipment.

Force calibration can be complex because the mechanical interactions of not using the proper adapters can produce significant errors. We welcome the opportunity to help reduce these errors by answering your questions or concerns.

For more information read:

[Recommended Compression and Tension Adapters for Force Calibration](#)

[Common Measurement Errors in Weighing](#)

[Conditions, Methods, and Systems that Impact Force Calibration](#)