

BT Wireline Pressure Setting Tool

for setting Alpha Oil Tools bridge plugs, frac plugs, & cement retainers

General Description

The BT Wireline Pressure Setting Tool is devised for the setting of equipment in the well bore. Products of combustion are used to provide the gradual development of force through pressure. The force in the setting tool operates the various parts which allow the successful setting of Bridge Plugs, Cement Retainers, Production Packers, etc.

The pressure that powers this tool is built up through the burning of a Power Charge. The pressure is confined to the correct portion of the tool through the use of O-Ring Seals and it is critical that these seals be maintained in perfect condition.

The BT Wireline Pressure Setting Tool incorporates a manual bleeder valve to provide a safe and easy way of bleeding trapped pressure prior to disassembly after the tool has made a run in the well.

To operate the BT-10 and BT-20 tools in a safe manner, do not run if the hydro static pressure exceeds 15,000 psi. When bottom hole pressure exceeds 15,000 psi, some of the parts must be replaced with special heavy-duty replacement parts. The BT-10 replacements will include the pressure chamber, upper and lower cylinders, and manual bleeder valve connector. The BT-20 replacements will include the pressure chamber and the upper and lower cylinders.

Alpha Oil Tools does not manufacture, market or stock the products of combustion and cannot keep up with the ingredients that each manufacturer may include in their version. It is recommended that you keep a list provided from the manufacturer that you purchase from and make it available to medical staff in the event of an accident. Some of the common products used can be: Potassium Chloride, Strontium Oxide, Oxides in Nitrogen – both nitrous and nitric, Carbon Dioxide, Carbon Monoxide, Carbon, Nitrogen based hydrocarbons, unburned asphalt, and Acetic fraction and paraffin.

Assembly Information

Please note the following:

- All O-Rings must be replaced after each job and no substitutions of O-Ring sizes.
- All O-Rings should be lightly lubricated with downhole grease.
- Do not get excess grease inside the tool.
- All threaded connections should be lubricated with tool grease made up tight using the spanner wrench with a mallet.
- Refraining from using pipe wrenches on this tool assembly enhances the longevity and safety of this tool. **If a pipe wrench is used, only place it on the knurled surfaces which are provided.**
- Do not fill the tool with oil until it is time to go on a job (do not leave an oil filled tool in storage).
- All parts in this tool must be clean of dirt and debris prior to assembly
- Assembled tool storage should be in the horizontal position.
- Do not interchange parts with other manufacturers. Always replace worn parts with Alpha Oil Tools replacement parts.

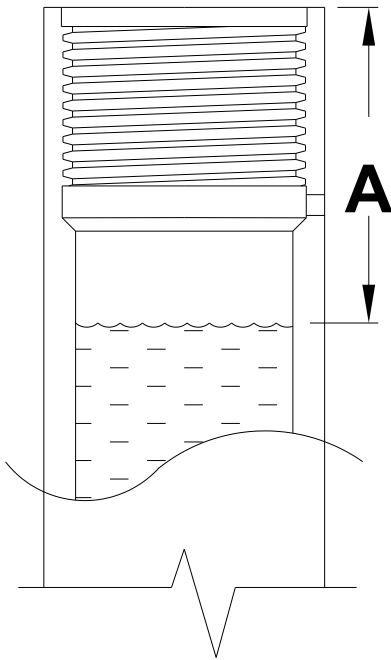
Bleeder Valve Assembly Instruction

1. Install O-ring item 6 in the bleeder valve recess.
2. Install Seat item 4.
3. **Stem style only:** Install O-Ring item 5 onto Stem item 8.
4. **Stem style only:** Thread Stem into bottom of Retainer item 7 until it shoulders up.
5. Screw Retainer into left-hand thread of recess. The retainer must shoulder out on Seat.
6. Retainer with left handed thread is recommended to be torqued to 75 FT/LB “Stem Style or Disk Style.”
7. **Stem style only:** Screw the Stem down until wrench tight.

Assembly Instruction

1. Place Cross Link Sleeve item 23 into vise.
2. Lubricate Sleeve and Setting Mandrel item 24 with grease and slide Setting Mandrel into the Sleeve (long threaded end of Setting Mandrel must be positioned toward top of tool).
3. Lubricate Piston Rod item 16 and slide into the Setting Mandrel aligning slot in Piston Rod with slots in the Cross Link Sleeve and Setting Mandrel.
4. Insert Cross Link item 22.
5. Slide Link Retaining Ring item 19 over Cross Link until flush with shoulder on Cross Link Sleeve.
6. Install Set Screw item 21.
7. Install O-Rings items 2 & 17 onto Cylinder Head item 18.
8. Slide Cylinder Head over Piston Rod.
9. Make up the threads of Cylinder Head to the long threaded end of Setting Mandrel hand tight.
10. Position Cylinder Head tight against Cross Link Sleeve and install Set Screw item 20.
11. Install O-Rings item 2 onto Piston item 13.
12. Slide Piston onto the Piston Rod.
13. Insert Retaining Pin item 14 and then Set Screw item 15 wrench tight.
14. Lubricate Piston, threads on Cylinder Head and lower end of Cylinder bore and slide Cylinder (item 12 on BT-10 and item 9 on BT-20) over Piston. The Piston pushes the lubricant through the I.D. of Cylinder. Make up lower Cylinder onto Cylinder Head, making sure Cylinder Head is positioned against Cross Link Sleeve while Cylinder is made up.
15. Install O-Rings item 2 onto Cylinder Connector item 11.
16. Inspect Cylinder Connector for clear hole through with no debris. Look for the end with stamped message “this end up” and it should be the end with the smallest hole.
17. Make up Cylinder Connector with Lower Cylinder making sure small hole is looking up.
18. BT-10 only – Install O-Rings item 2 onto Manual Bleeder Valve Connector item 3.
19. BT-10 only – Make up Cylinder item 9 and Pressure Chamber item 1 to Manual Bleeder Valve Connector.
20. BT-20 only – Install O-Rings item 2 onto Pressure Chamber item 1.
21. BT-20 only – Make up Cylinder item 9 to Pressure Chamber.
22. Install O-Rings item 2 onto Floating Piston item 10.
23. Place Floating Piston into Upper Cylinder with palms of hands. With aluminum tube, wooden dowel or a broomstick, push Floating Piston through Upper Cylinder until it contacts Pressure Chamber (BT-20) or Manual Bleeder Valve Connector ((BT-10).
24. Stand upper half of tool on end with the Upper Cylinder facing up. Check the specifications for correct oil level in the applicable well based on the well temperature.
25. Fill the Cylinder with clean motor oil (SAE 10 to 40) to the recommended level. Note: if tool is to be stored prior to its use, oil should not be put in the cylinder until it is taken out of storage.
26. Make up lower half of tool onto upper half of tool.
27. Place Upper Cylinder in vise being careful not to distort Cylinder bore. Tighten joints at Cylinder Connector and Cylinder Head. Air trapped in Cylinder during tightening should make Cross Link sleeve stand off from Cylinder Head not more than 3/8 inch.
28. BT-20 only - Screw Adjuster Sub item 26 onto Setting Mandrel. Install Set Screw item 25.

Oil Level Chart



DISTANCE FROM END OF CYLINDER TO OIL

TEMPERATURE	DIMENSION "A" (IN.)	
	BT-10	BT-20
200 DEG. OR LESS	4	4
200 - 275 DEG.	4 1/8	4 1/2
275 - 350 DEG.	4 3/8	5
350 - 400 DEG.	4 5/8	5 1/2

Operation

At this point the BT Wireline Pressure Setting Tool has been fully assembled with correct oil level and is ready to receive other equipment that will be made up on the bottom end for setting in the well bore and left there. These operation instructions are meant to be carried out on the well location and please consider the safety of your crew as well as those who may be nearby. Read all instructions by Alpha Oil Tools as well as those provided by other suppliers including the manufacturer of the ignitor and power charge.

1. Install appropriate setting sleeve for the equipment being run onto the setting tool and wrench tighten.
2. Install shear stud or shear ring into the plug, retainer, etc. If using a shear ring, install setting nut.
3. Install tension mandrel and tighten with pliers.
4. Install tension mandrel lock spring far enough where $\frac{1}{2}$ inch of threads are above the spring.
Note: Do not run without a lock spring. The equipment can back off going into the hole.
5. Make up the equipment onto setting tool by screwing the tension mandrel into setting tool. The lock spring will turn on the tension mandrel as the make up occurs. If you have to remove the equipment the tension mandrel will unscrew from the shear stud or the stud will unscrew from the plug. Go back to step 2.
6. Install power charge.
7. Install redressed firing head with ignitor.
8. Install all other equipment including the cable head.
9. When picking up the setting tool and equipment, do not place the equipment end on the ground and let the shear stud or ring and the slips bear the weight. Otherwise damage will occur.
10. After the run and before returning to the shop, refer to the disassembly instructions contained in this document and bleed off the pressure trapped inside the pressure setting assembly. Once the pressure is bled, return to the shop and as quickly as possible complete the disassembly instructions.

Disassembly Instruction

WARNING: After the firing head and pressure setting assembly have been run and fired, gas under very high pressure will be trapped inside the tools. *This pressure must be bled off before disassembly is begun.* Follow disassembly instruction carefully. Failure to comply may result in serious injury.

Failure to disassemble and clean these tools immediately following a run will cause the tool to deteriorate and greatly shorten the tool life. The environment created from firing the tool is very corrosive to the tool itself and the longer it is exposed to it, the more damage that is done.

1. Hose off assembly to clean and cool it. Lay tool down, being careful not to damage it or adapter kit. If cable head appears to be too tight, skip down to step 6 and bleed the tool pressure before removing cable head.
2. Remove Setting Sleeve.
3. Hold ear of Tension Mandrel Lock Spring with pliers and twist against spring to relieve bind on threads. Unscrew Tension Mandrel.
4. BT-20 only – Remove Set Screw item 25 and then remove Adjuster Sub item 26.
5. Place lower Cylinder (item 9 on BT-20 & item 12 on BT-10) in the vise, position bleeder hole in Cylinder away from you and slowly unscrew Cylinder Head item 18 until compression air escapes. Do not back off Cylinder Head from Cylinder more than 1 ¼ inch at this point.
6. Turn the pressure setting assembly in the vise so that the manual bleeder valve is away from you and the Retainer item 7 of manual bleeder valve is facing up. Using manual bleeder valve wrench item 27:
Stem type: slowly turn Stem (LH threads) until it shoulders on the Retainer item 7. Pressure should bleed off at the pressure vent.
Disk type: slowly turn wrench (LH threads) until making contact with seat. Rotate wrench in ¼” turn in at a time and back off repeatedly until pressure bleeds.
7. Hold back up on Pressure Chamber item 1, position bleeder hole in Pressure Chamber away from you and slowly unscrew firing head until pressure bleeds off. Do not back off firing head more than 1 ¼ inch at this point.
8. If pressure does not bleed off, position bleeder holes in the Upper Cylinder away from you and slowly unscrew Pressure Chamber until pressure escapes. Do not back off Pressure Chamber more than 1 ¼ inch from Cylinder at this point.
9. If pressure still exists, drive a nail into the exhaust holes being sure to stand clear of those holes.
Note: All pressurized gas must be exhausted before continuing with disassembly.
10. Unscrew and remove firing head.
11. Screw Stem back down to prevent damage.
12. Unscrew Pressure Chamber.
13. Unscrew and remove Upper Cylinder and, if BT-10, the Manual Bleeder Valve Connector.
14. Using an aluminum tube, wooden dowel or broomstick, push the burnt power charge from the Pressure Chamber.
15. Push Floating Piston item 10 out lower end of Upper Cylinder with an aluminum tube, wooden dowel or broomstick.
16. Unscrew Cylinder Connector item 11 from Lower Cylinder and discard oil.
17. Remove Lower Cylinder from Cylinder Head.
18. Remove Set Screw item 15 and Retaining Pin item 14 from Piston item 13.
19. Remove Piston item 13 from Piston Rod item 16.
20. Remove Set Screw item 20 from Cylinder Head.
21. Remove Cylinder Head.
22. Remove Set Screw item 21 from Link Retaining Ring item 19.
23. Remove Link Retaining Ring.
24. Remove Cross Link item 22.
25. Slide Piston Rod out of Setting Mandrel item 24.
26. Slide Setting Mandrel out of Cross Link Sleeve.
27. Remove Retainer from Bleeder Valve. **Stem type only:** Unscrew Stem from Retainer
28. Remove Seat form Bleeder recess. If difficult screw the Manual Bleeder Valve Wrench into the Seat and remove.
29. Remove all O-Rings
30. Clean all parts to remove any corrosive elements.

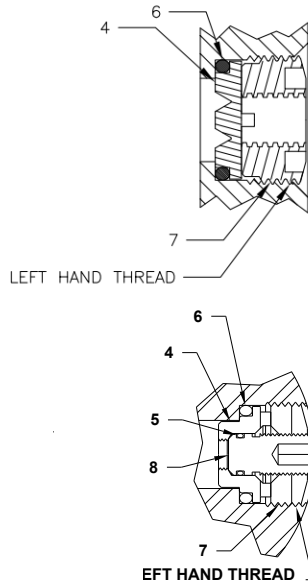
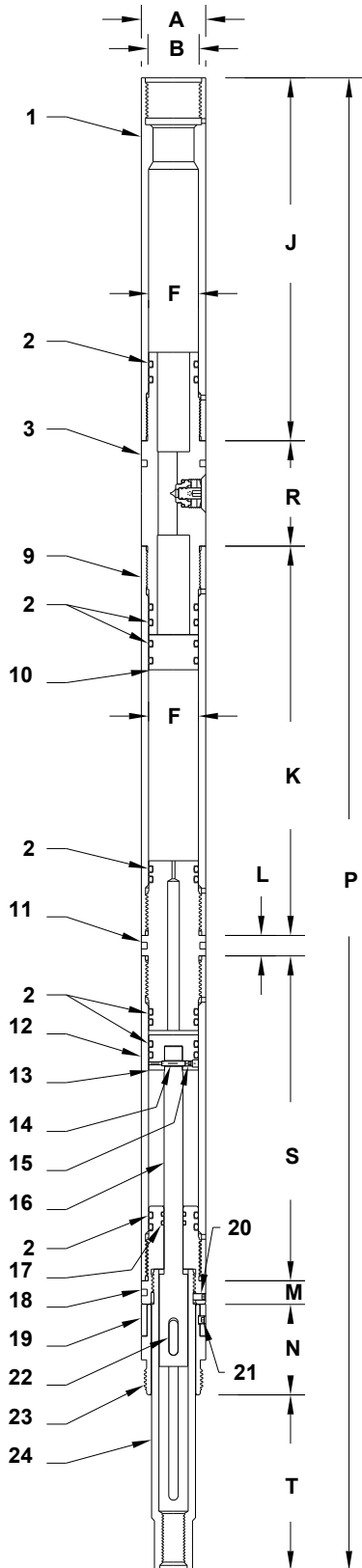
Note: A complete cleaning and redress is required before each run for safety and dependability.

Cleaning Procedure

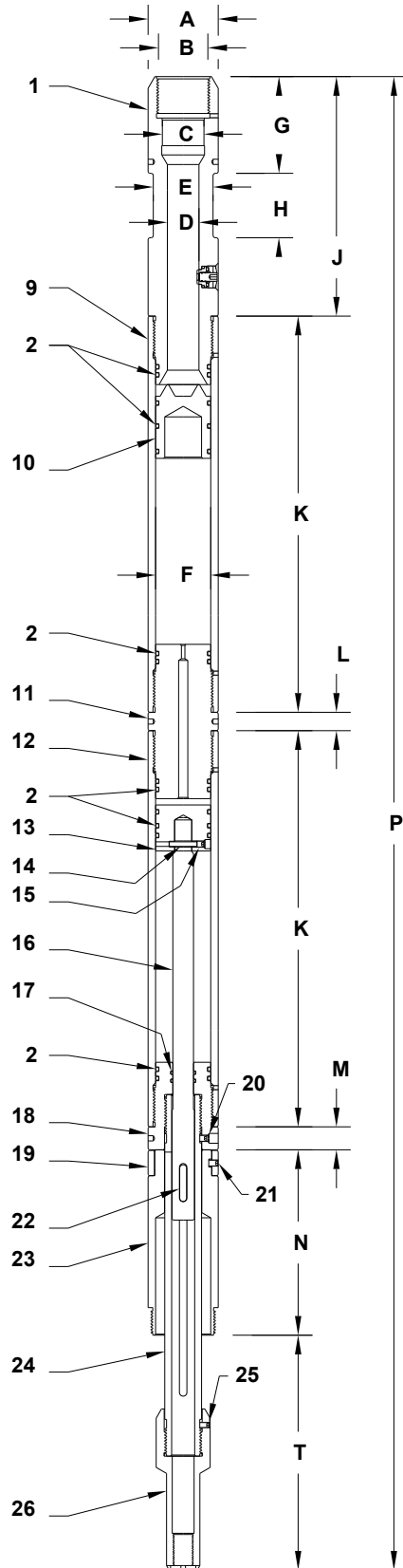
1. Once Unassembled, remove power charge debris from the chamber and cylinders by washing with a solvent followed by washing with soapy water.
2. Remove power charge debris from vents in firing heads, cylinders, and floating pistons by washing with solvent and followed with soapy water.
3. Clean all remaining parts with solvent and then soapy water.
4. Visually inspect the tool components and check the critical dimensions as outlined in this technical unit.

BT Tool Illustration

BT-10

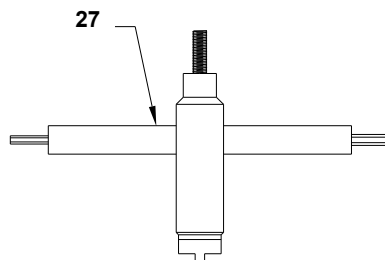


BT-20



DIM.	BT-10	BT-20
A*	2.75	3.8
B	2.22	2.69
C	-	2.25
D	-	1.75
E	-	3.25
F	2.12	3.0
G	-	5.2
H	-	3.5
J	15.5	13.0
K	16.2	21.5
L	.9	1.0
M	1.0	1.2
N	3.9	10.1
P	63.8	6.2 FT.
R	4.5	-
S	13.9	-
T	7.5	12.75

* - HEAVY DUTY CYLINDER
OD IS AVAILABLE:
BT-10 O.D. = 3.250
BT-20 O.D. = 4.125



Parts List

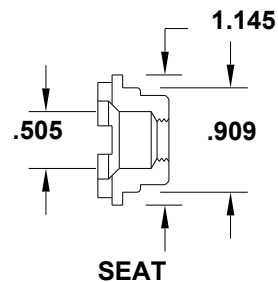
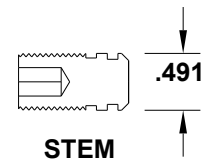
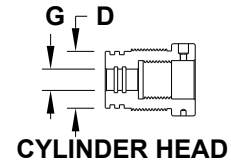
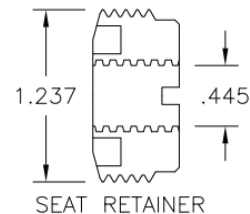
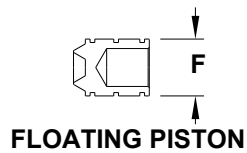
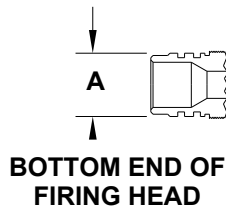
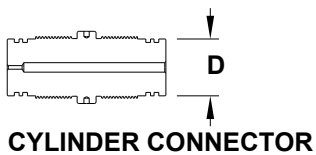
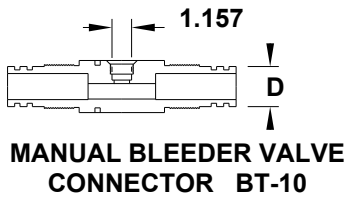
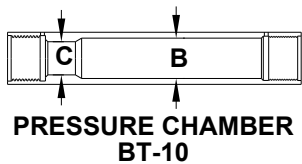
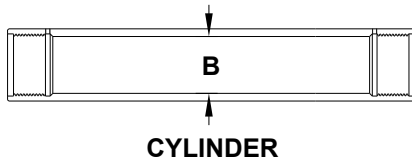
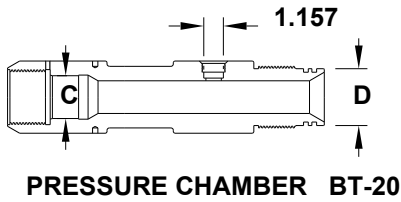
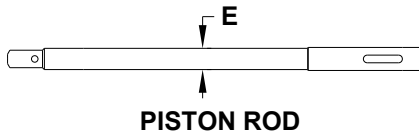
ITEM NO.	PART DESCRIPTION	NO. REQ'D.	BT-10 PART NUMBER	BT-20 PART NUMBER
-	Assembly – Wireline Pressure Setting Tool - Stem	-	024-2750-000	024-3812-000
-	Assembly – Wireline Pressure Setting Tool - Disk	-	024-2750-100	024-3812-100
1	Pressure Chamber	1	024-2750-035	024-3812-035
2	O-Ring	14	100-2327-090N	100-2334-090N
3	Manual Bleeder Valve Connector	1	024-2750-036	Not required
4	Seat – Stem style Seat (Disk) – Disk style	1	024-2750-049 024-2750-054	
5	O-Ring – Stem only	1	100-2012-090N	
6	O-Ring	1	100-2213-090N	
7	Seat Retainer – Stem style Seat Retainer – Disk style	1	024-2750-050 024-2750-055	
8	Stem – Stem only	1	024-2750-051	
9	Upper Cylinder	1	024-2750-038	024-3812-038
10	Floating Piston	1	024-2750-037	024-3812-037
11	Cylinder Connector	1	024-2750-039	024-3812-039
12	Lower Cylinder	1	024-2750-040	024-3812-038
13	Piston	1	024-2750-041	024-3812-041
14	Retaining Pin	1	024-2750-042	024-3812-042
15	Set Screw	1	5/16 – 18 x ½	3/8 – 16 x ½
16	Piston Rod	1	024-2750-046	024-3812-046
17	O-Ring	2	100-2211-090N	100-2216-090N
18	Cylinder Head	1	024-2750-043	024-3812-043
19	Link Retaining Ring	1	024-2750-044	024-3812-044
20	Set Screw	1	5/16 – 18 x ½	3/8 – 16 x ½
21	Set Screw	1	5/16 – 18 x ¼	3/8 – 16 x ½
22	Cross Link	1	024-2750-045	024-3812-045
23	Cross Link Sleeve	1	024-2750-047	024-3812-047
24	Setting Mandrel	1	024-2750-048	024-3812-048
25	Set Screw	1	Not required	5/16 – 18 x ½
26	Adjuster Sub	1	Not required	000-4240-209
ACCESSORY EQUIPMENT				
27	Bleeder Valve Wrench – Stem Style Bleeder Valve Wrench – Disk Style	1	024-2750-064 024-2750-065	
28	Spanner Wrench (not shown in illustration)	1	024-2750-074	024-3812-074

Critical Dimensions for Periodical Inspection

The following dimensions need to be checked by the end user. Alpha Oil Tools cannot keep up with the tools and inspect them, so it is stated by Alpha that the customer needs to check these on his own. It can be done with the tools listed below. If you still have questions Alpha will assist you in understanding a proper inspection routine and how it is completed.

Once any of these parts exceed the tolerances shown, the part will need to be replaced with a new one from Alpha Oil Tools and no substitutions from other suppliers are guaranteed to be compatible and safe. Furthermore Alpha Oil Tools does not guarantee its parts to be compatible with any other suppliers.

Critical Dimensions for Periodical Inspection - continued



ALL DIMENSIONS ARE THE MAXIMUM ACCEPTABLE FOR THE ID's AND MINIMUM ACCEPTABLE FOR THE OD's

DIM.	BT-10	BT-20
A	1.744	2.243
B	2.128	3.004
C	1.753	2.253
D	2.118	2.994
E	.807	1.122
F	2.118	2.986
G	.816	1.130
H	2.115	2.986

ALL DIMENSIONS ARE IN INCHES

The tools used to measure the dimensions shown can be Dial Calipers, Micrometers, and Telescoping Gages. A Dial-Bore Caliper is very useful for checking ID's but is not a necessity. The Telescoping Gages can accomplish the task of measuring ID's. Keep in mind that all measuring devices can lose calibration and must be re-calibrated from time to time.