american time®

Integrated Solutions

Synchronous Wired and Electronic Movement Manual

Hanson Movement

General
Synchronous-wired and electronic secondaries are controlled by a Hansen movement. Except for a short correction cycle each hour, the movement is solely responsible for the timekeeping accuracy of the secondary.

Normal Drive (Fig. 59)

Second Hand
1. A 1rpm synchronous motor drives motor pinion A directly.

2. Pinion A drives second hand shaft B via friction coupling assembly C.

Minute Hand
3. Pinion D which is fixed to friction coupling assembly C drives seconds-to-minute reduction gear E.

4. Pinion f which is fixed to gear E, drives minute drive gear G.

5. Gear G drives pinion J via friction spring K. Minute hand shaft H is fixed to pinion J.

Hour hand
6. Pinion J drives intermediate gear L.

7. Pinion M which is fixed to gear L, drives hour drive gear P. Hour hand shaft N is fixed to gear P.

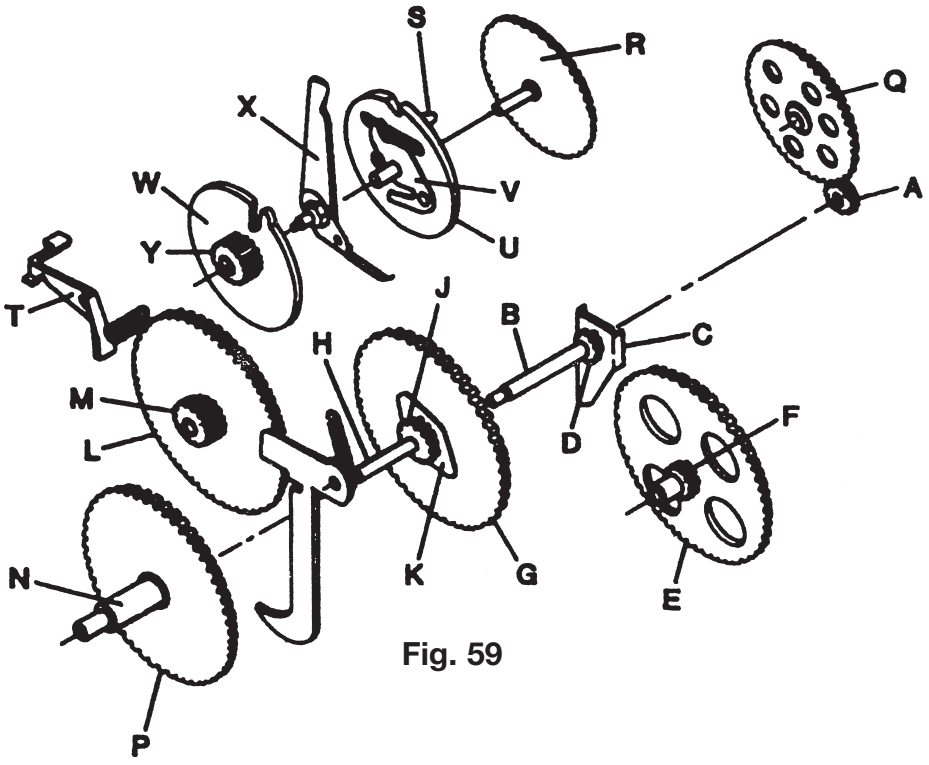


Fig. 59

Hourly Correction

See Fig. 59

1. Pick-up ratchet R is continuously rotating at a rate of 1rpm. this is due to the drive applied to it via ratchet drive gear Q, by pinion A. Except during a correction cycle, pawl throwout lever T prevents pick-up pawl S from engaging ratchet R.

See Fig. 63A on Page 3

2. From 57:54 to 58:02 of each hour (master clock time), a correction signal that is initiated by the master clock causes the correction solenoid to energize.

3. When the solenoid energizes, the corrective lever (mounted to the solenoid leaf) engages the pick-up ratchet.

4. The corrective lever then begins to move upward. After 6 seconds it lifts the pawl throw-out lever and thereby releases pick-up pawl S (Fig. 59).

See Fig. 59

5. Pick-up pawl S engages ratchet R. Stop disc assembly U then rotates at the same speed as ratchet R.

6. As stop disc U rotates, pick-up spring V slides around minute hand setting disc W. When the spring engages the slot in disc W. disc W then rotates at the same speed as ratchet R (see NOTE at the top of the page). Also, as disc U rotates, the projection end of aligner lever X is placed into the orbit of the projection on friction coupling assembly C. When the projections meet, the normal drive of the movement is stopped. (The projections will not meet if the secondary is "on time" with the master clock)

7. Pinion Y, which is fixed to disc W, then drives intermediate gear L. Gear L drives minute drive pinion J and minute hand shaft H. (Pinion M, which is fixed to gear L, drives hour gear P and hour hand shaft N) This drive causes the secondary to advance at a rate 60 times normal speed.

8. At the 59th minute (master clock time), stop disc assembly U has completed one revolution. Throwout lever T, which returns to its original position eight seconds after the initiation of the correction cycle, causes pick-up pawl S to disengage from ratchet R. the minute hand of the secondary should be on the 59th minute, and the second hand on the 00 second mark.

NOTE: The normal drive of the secondary causes minute hand setting disc W to rotate. If the secondary is "on time" with the master clock, the slot in the setting disc will have advanced to a point where the pick-up spring will make a complete revolution without engaging the slot. If this is the case, minute hand setting disc W will not be speeded up to the speed of ratchet R. the normal drive of the secondary will continue to operate the movement.

12 Hour Correction (Figs. 60A & 60B)

A 12-hour correction cycle is accomplished merely by allowing the movement to go through more than one hourly correction cycle. This is accomplisher as follows:

1. From 5:57:54 to 5:58:08 AM & PM (master clock time), a 12 hour correction signal that is initiated by the master clock causes the correction.

2. After 6 seconds the movement is placed into hourly correction cycle. Since the solenoid remains energized for a total of fourteen seconds, throwout lever A is lifted high enough to be latched into a raised position by 12 hour latch lever B (see NOTE below). This causes the movement to advance (in the same manner as previously explained for hourly correction(at a rate 670 times normal speed until latch lever B rides onto stud C and allows throwout lever A to return to its normal position.

NOTE: If the movement is on the correct hour, latch lever B will be in the position illustrated by Fig. 60B and therefore prevent throwout lever A from being latched. Therefore, only one hourly correction cycle would be completed.

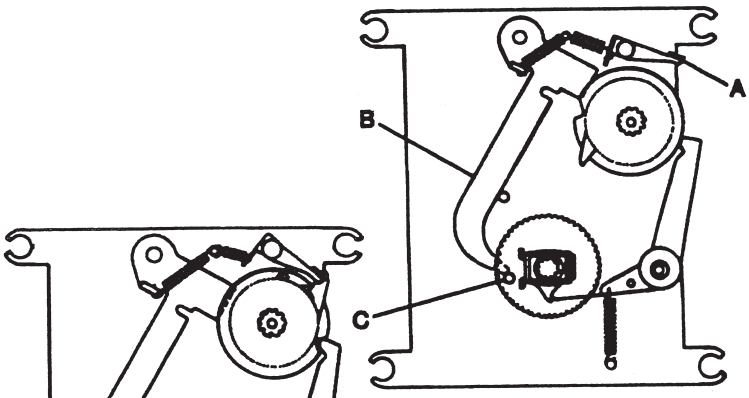


Fig. 60A

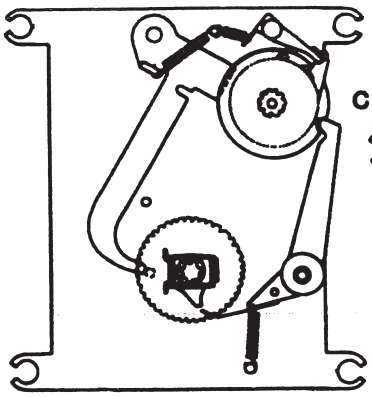


Fig. 60B

Manual Time Setting

Synchronous-wired and electronic secondaries can be manually set to the correct time in accordance with the following procedure:

See Fig. 59

1. If the secondary is not reading the hour desired or if it is ahead of the correct time, initiate an hourly correction cycle by manually lifting throwout lever T just enough to allow pick-up pawl S to engage ratchet R (see NOTE below).

2. The secondary will advance to the 59th minute at a rate 60 times normal speed. Repeat step 1 until the secondary reads one minute before the desired hour.

3. The minute hand will then be advanced to the correct minute by rotating the seconds to minutes reduction gear as illustrated by Fig. 61. It is advisable to set the secondary slightly behind the correct time so that it will be synchronized with the master clock upon completion of the next automatic hourly correction.

NOTE: If the throwout lever is raised high enough, it latches in a 12 hour correction position. It may be released by gently pushing downward on the latching portion of the 12 hour latch lever (B-Fig. 60A), or it may be left in this position to allow the secondary to advance to 6 o'clock.

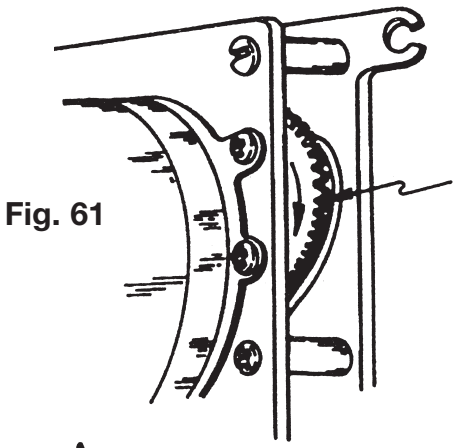


Fig. 61

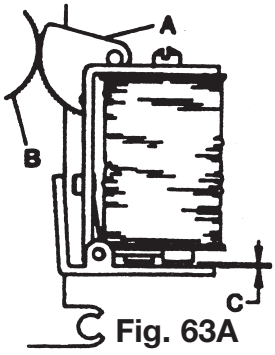


Fig. 63A

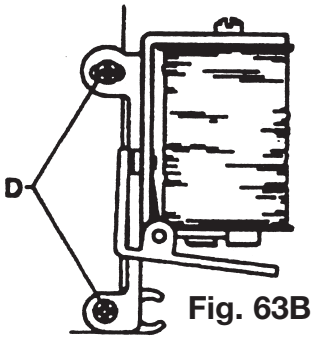


Fig. 63B

Positioning of Hands

Synchronous-wired and electronic secondaries can be manually set to the correct time in accordance with the following procedure:

See Fig. 59

The following procedure should be used when replacing or repositioning the hands of any synchronous-wired or electronic secondary: (to gain access to the hands, it is necessary to remove the crystal from the secondary. To do so, first remove the clock case and then lift the crystal out. Replace in the reverse order)

Minute Hand

1. With power "ON" manually initiate and hourly correction cycle. Immediately remover power when throwout lever T causes pick-up pawl S to disengage ratchet R (Fig. 59); a slight "click" can be heard.

2. The minute hand should be directly over the 59th mark of the dial. If it is not, move the hand counter-clockwise until it is directly over the 59th minute mark. (Make certain that the minute hand retaining nut is tight) Repeat step 1 to check adjustment.

Second Hand

1. With power "ON", manually initiate an hourly correction cycle, remove power as soon as the second hand stops.

2. The second hand should stop on the 00 seconds mark of the dial. If it does not, loosen its retaining nut and position the hand accordingly. Re-tighten the nut. Repeat step 1 to check adjustment.

Hour Hand

1. With power "ON", lift the throwout lever (T-Fig. 59) so that it latches in a raised position.

2. Manually advance the minute hand until the throwout lever returns to its normal position. Then advance the minute hand to the hour. The hour hand should be directly over the 6 o'clock mark of the dial. If it is not, position it accordingly. (The hour hand is frictionally held to its drive shaft and may be moved in either direction)

Adjustments:

See Fig. 62

1. With the correction solenoid de-energized and pick-up pawl A resting against throwout lever B (as illustrated), the clearance (D) between the lobe on lifting arm C (when the lobe is at its closest point to pick-up pawl A) should be .005" to .015". Adjustment is made by forming armature projection E accordingly (this should also result in a clearance of approximately .025" at F).

2. With gear segment A bottomed in ratchet B, the clearance at C should be .003". Adjustment is made by loosening screws D, positioning the entire solenoid assembly accordingly, and retightening the screws.

3. When engaged, the gear segment should mesh with at least 2/3 of the width of the ratchet. Adjustment is made by forming the armature are accordingly.

See Fig. 64

4. Spacing at A should be .075". Adjustment is made by loosening nut B, positioning the gear segment accordingly and re-tightening the nut.

See Fig. 65A and 65B

5. When throwout lever A causes pick-up pawl B to disengage the ratchet, the clearance at C should be .010". Adjustment is made by adjusting eccentric stud D. Turning the stud positions aligned lever E and controls the position at which stop disc F will stop. This in turn raises or lowers the ratchet end of the pick-up pawl when the pawl is engaged by the throwout lever.

S**ee Fig. 66**

6. With the aligned lever in the seconds stop position (as illustrated), there should be an overlap at C of .015", between stop spring A and the projection on friction coupling assembly B. Adjustment is made by forming stop spring A accordingly.

See Fig. 67

7. During a correction cycle, pick-up spring A should engage setting disc B as illustrated. Adjustment is made by forming the spring accordingly.

Fig. 62

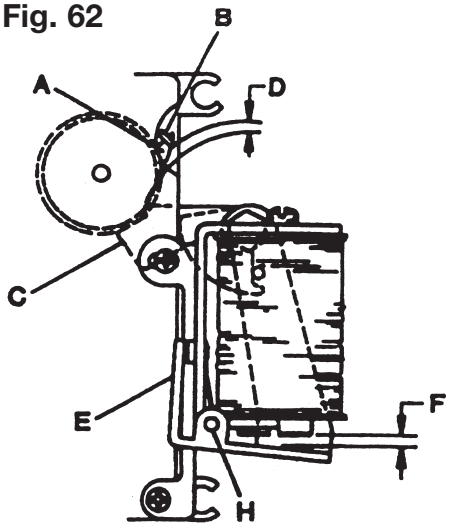


Fig. 64

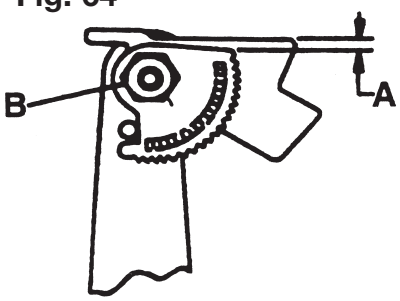


Fig. 65A

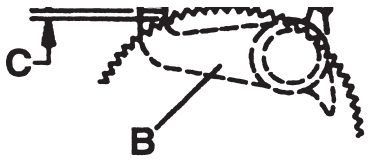


Fig. 66

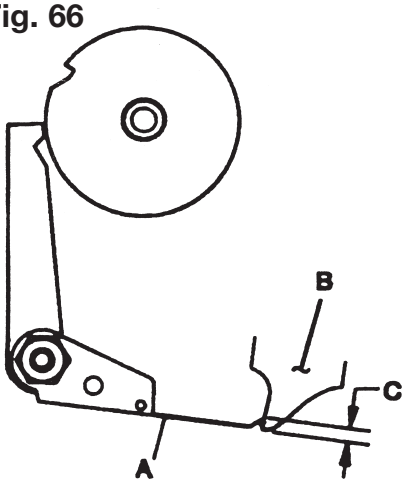


Fig. 65B

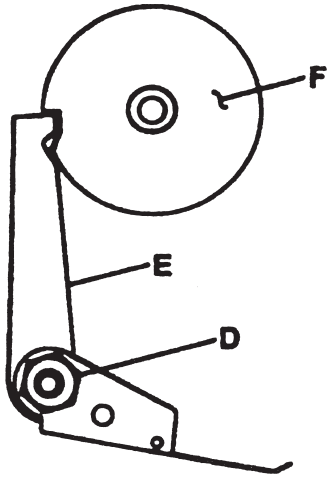
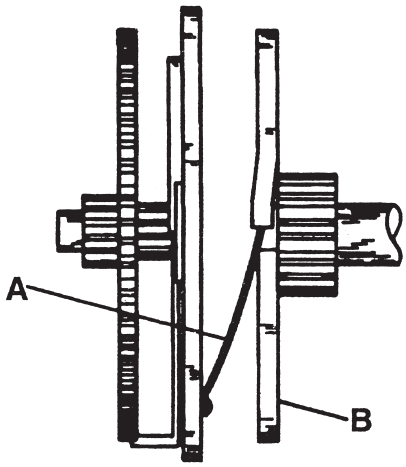


Fig. 67



See Fig. 68A

8. With throwout lever A at the point of drop-off on hourly correction lobe B, and the aligned lever out of the notch in the stop disc (Fig. 66), the tail (C) of the throwout lever should still be on 12 hour latch lever D (as illustrated). Adjustment is made by forming tail C accordingly.

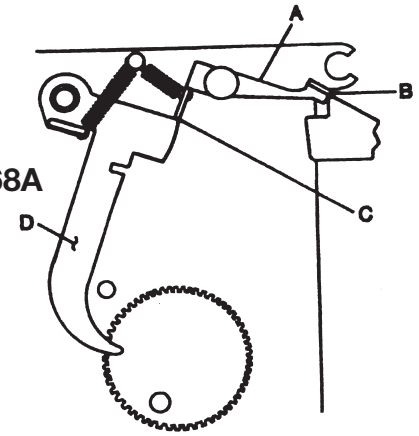


Fig. 68A

See Fig. 68B

9. With power "ON" and the correction solenoid energized for 12½ seconds, there should be a slight clearance at A. Adjustment is made by forming the tail of the throwout lever accordingly. (Adjustment number 8 must be maintained)

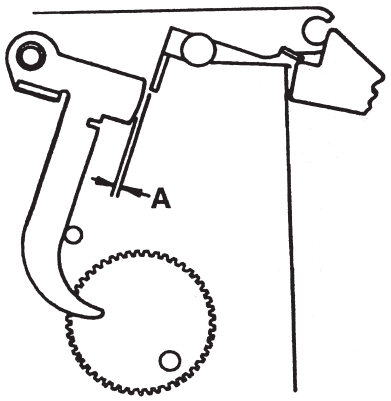


Fig. 68B

See Fig. 69

10. With the aligned lever engaged in the stop disc notch, and the 12 hour latch lever off the stud (Fig. 68B), there should be an overlap at A of .313" (1/32") between the 12 hour latch lever and the throwout lever. Notch B in the 12 hour latch lever is provided to allow the lever to be formed accordingly.

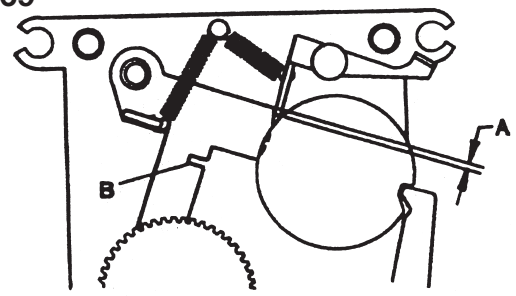
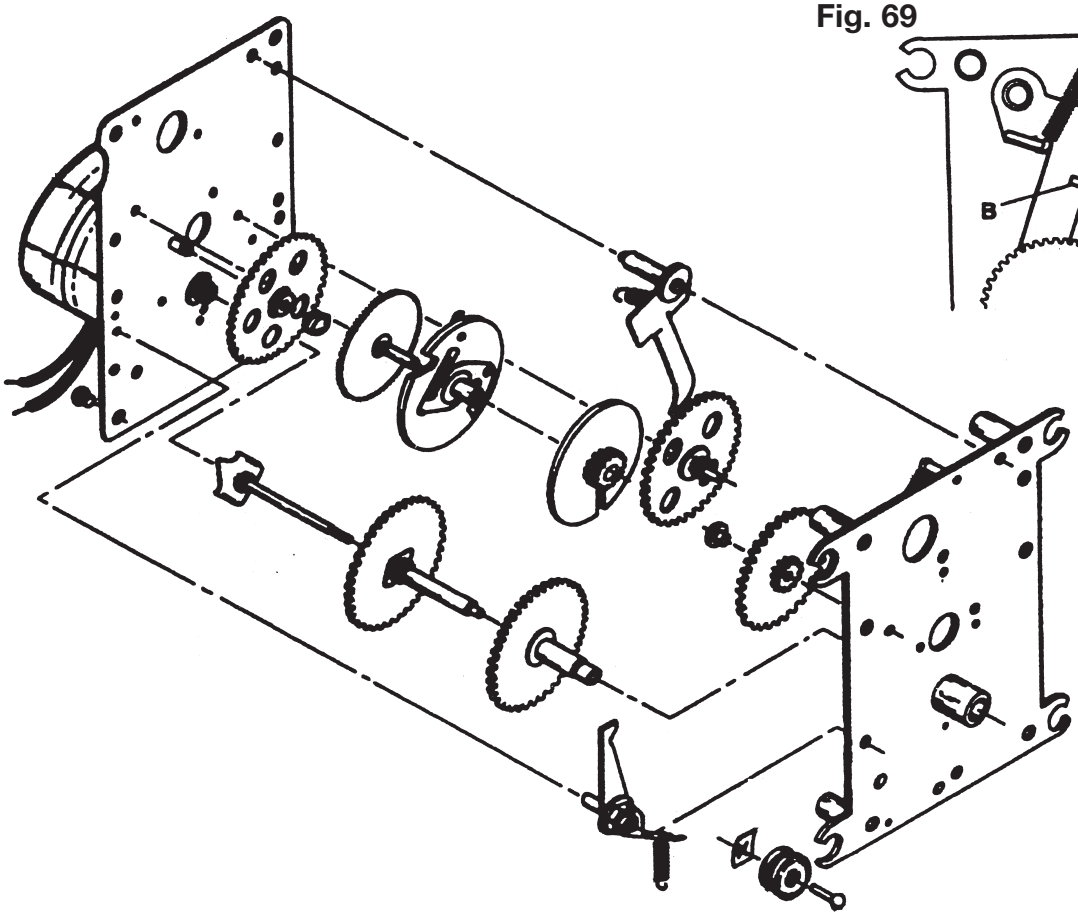
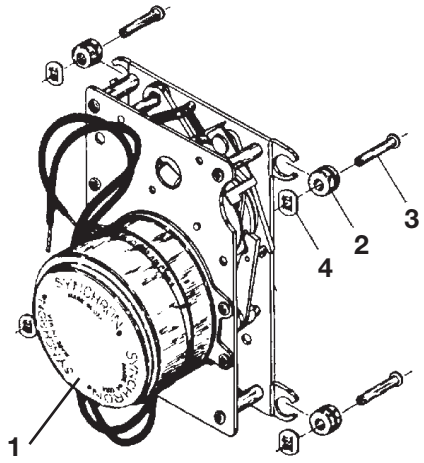


Fig. 69



Synchronous, Self-Regulating Replacement Motor Movement & Parts

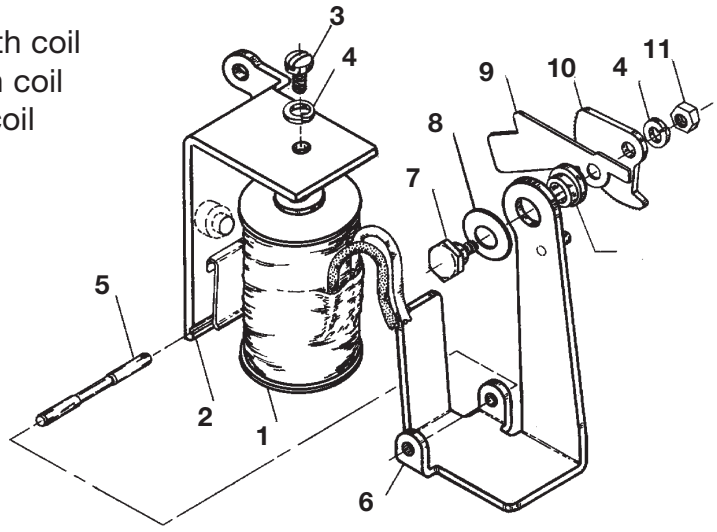


Parts List

Part No.	Item #	Description
33-1111		120vac/60Hz movement
33-1112		24vac/60Hz movement
288003	1	120vac motor
288001	1	24vac motor
226002	2	Grommet
394-127	3	Rivet
327002	4	Speed Nut (Simplex/IBM)

American Time Replacement for Simplex Correction Bracket Assembly

Part No.	Item #	Description
CA19110		120vac/60Hz assembly with coil
CA1924		24vac/60Hz assembly with coil
CA19E		Electronic assembly with coil
CA2020		Assembly less coil
542098R	1	110vac coil
542086R	1	24vac coil
5421990	1	Electronic coil
CA418	2	Yoke assembly
424037	3	Screw
268026	4	Washer
A2041	5	Roll Pin (529-138)
CA417	6	Armature
CA417A	6	Armature assembly
A2039	7	Stud (539-016)
A1210	8	Shim
CA020	9	Cam
S002	10	Sector
322117	11	Hex nut



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Toll Free: 800-328-8996
Fax: 800-789-1882
american-time.com

American Time
140 3rd Street South
PO Box 707
Dassel, MN 55325-0707