

Installation Instructions



12, 15 and 20 Series Drills Folding Markers

Used with:

- 1200, 1210 and 1220
- 1500, 1510 and 1520
- 2000, 2010 and 2020



When you see this symbol, the subsequent instructions and warnings are serious - follow without exception. Your life and the lives of others depend on it!

General Information

These instructions explain how to install the markers. The markers fold and unfold hydraulically for field operation. The marker disks leave a line for the drill operator to follow on the next field pass. Markers are mounted on the drill frame.

These instructions apply to:

113-490A	15-FOOT DUAL FF NO-TILL MKR W/SEQ
113-491A	20-FOOT DUAL FF NO-TILL MKR W/SEQ
113-457A	20-FOOT DUAL NO-TILL HYD FF MKR-94

Manual Update

Refer to the drill operator's manual for detailed information on safely operating, adjusting, troubleshooting and maintaining the markers. Refer to the parts manual for part identification.

- 12, 15 and 20 Series Drill Operator's Manual . . .118-389M-A
- 12, 15 and 20 Series Drill Parts Manual.118-389P

Before You Start

Beginning on page 4 are detailed lists of parts included in the marker packages. Use these lists to inventory parts received.

Assembly Instructions

Assembling Markers

Refer to Figure 1.

1. Lower drill into field position. Allow 9 feet on each end of a 15-foot drill and 11 feet on each end of a 20-foot drill for marker assembly.
2. Mount first marker section (1) on drill 6-by-6-inch frame tube. Mount plate so edge (2) is 3 1/2 inches (8.89 cm) from end of drill frame. On 20-foot drills, also install marker mount support (3) onto marker mount as shown. Secure mount with 3/4-by-6-by-7 3/4-inch u-bolts (4), lock washers (5) and nuts (6).
3. Remove port plugs on cylinder and carefully unfold first marker section. Rotate hinge section (7) into a horizontal position.
4. Align holes of break-away section (8) with holes in hinge section. Bolt sections together with stop block (9) on break-away section facing up. Use 5/8-inch pivot bolt (10), lock nut (11), 3/8-by-1 3/4-inch, grade 2 shear bolt (12) and lock nut (13).

IMPORTANT: Be sure shear bolt is a grade 2 bolt. Failure to use a grade 2 bolt can cause marker damage.

5. Repeat steps for other marker.
6. Adjust marker disks so they are square with ground when markers are lowered in field position. Refer to *Marker Adjustments*, "Adjustments," in operator's manual.

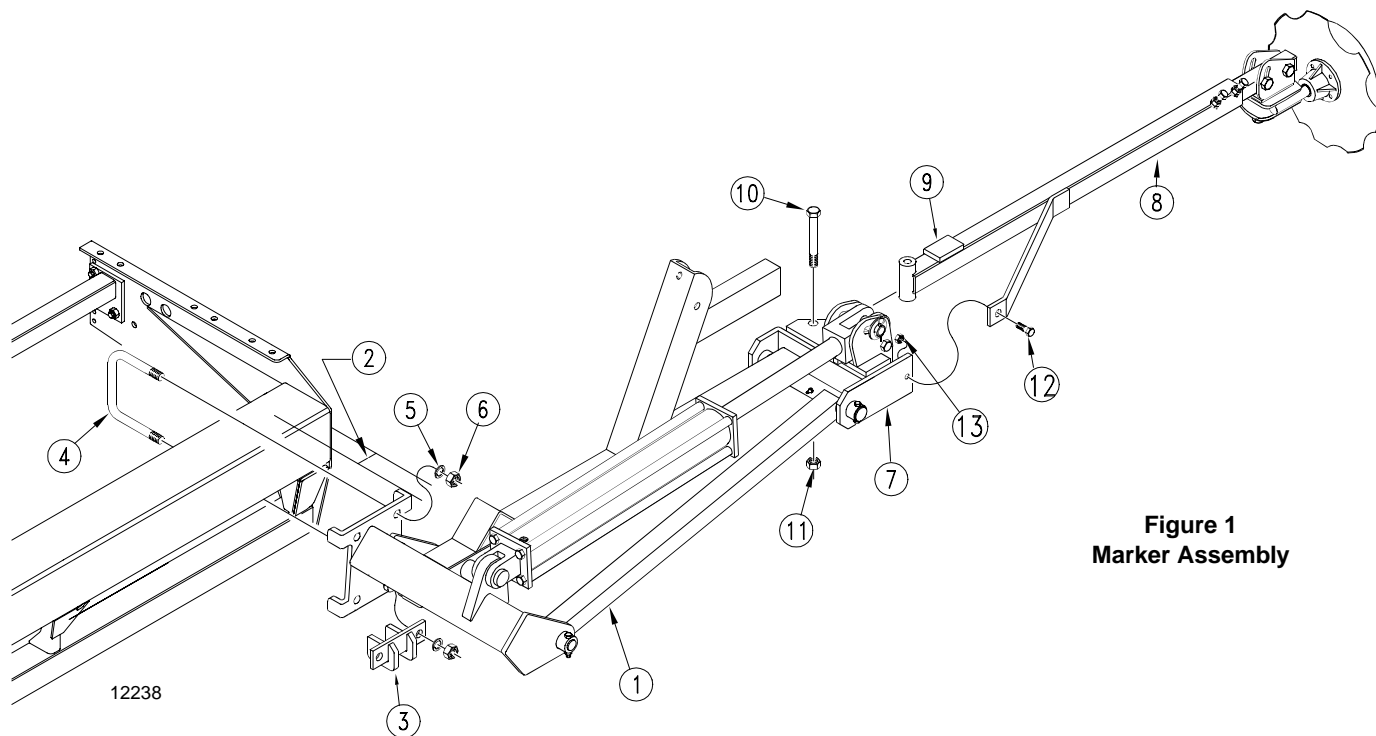


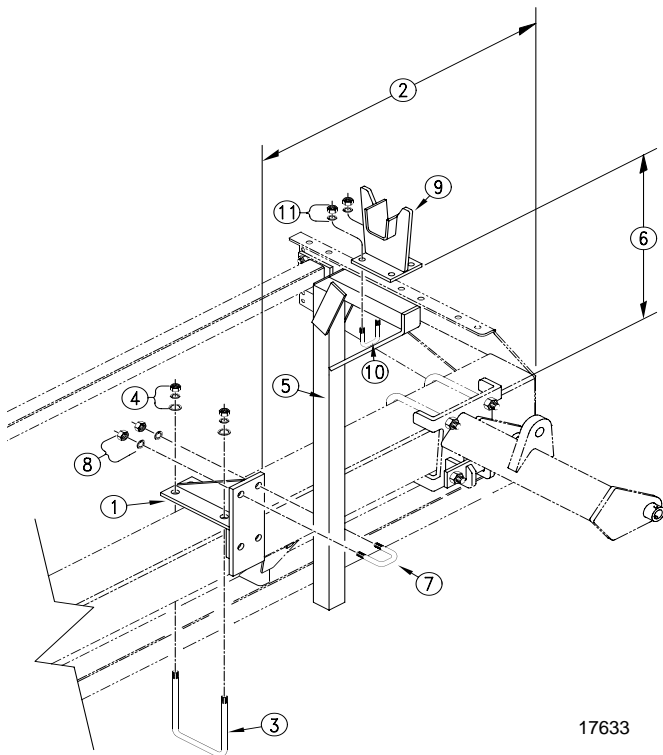
Figure 1
Marker Assembly

Assembly

Assembling Transport Arm

For 20-foot drills, assemble transport arm as follows. Refer to Figure 2.

1. Assemble transport-arm mount (1) onto 6-by-6-inch drill frame tube about 36 inches (91.44 cm) in from drill edge (2). Use 3/8-inch u-bolts (3), flat washers, lock washers and hex nuts (4).
2. Assemble marker-saddle arm (5) onto transport-arm mount at a height (6) of 32 1/2 inches (82.55 cm). Secure with 1/2-inch u-bolts (7), lock washers and hex nuts (8).
3. Mount marker saddle (9) onto marker-saddle arm with 1/2-inch u-bolts (10), lock washers and hex nuts (11). Adjust marker saddle as needed to ensure marker break-away arm rides in middle of marker saddle.



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Figure 2

Transport Carrier Assembly, 20 Series Drills

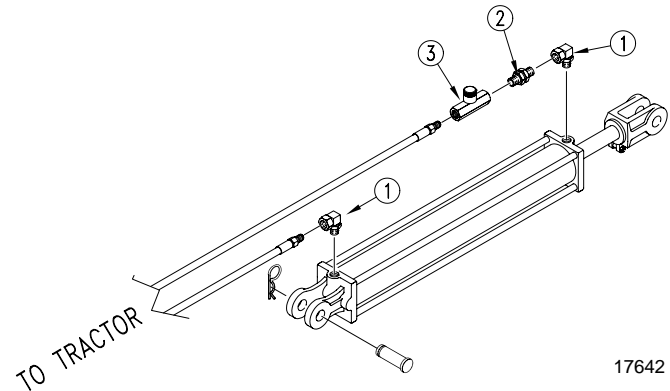
4. Repeat steps for other transport arm.

Installing Marker Hydraulics

Without Sequence Valve

Refer to Figure 3.

1. Install elbow fittings (1) in cylinder ports.
2. At rod end of each cylinder, install an adaptor (2) into elbow fitting. Install a needle valve (3) in adaptor.



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Figure 3

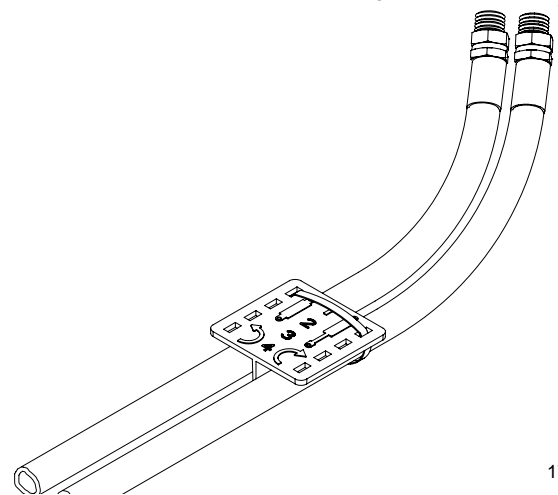
Assemble Needle Valve

3. Connect hydraulic hoses to fittings and route hydraulic hoses to tractor outlets. Route hydraulic hoses through transport-carrier mount at cutout. Use black cable ties to secure hydraulic hoses to drill frame.
4. Using orange cable ties, secure a plastic hose holder to each pair of hydraulic hoses near tractor outlets. See Figure 4.
5. Proceed with "**Bleeding Marker Hydraulics**," page 3.

With Sequence Valve

Refer to Figure 5.

1. Mount sequence valve on drill using mounting plate (1). Bolt plate to inside end of left-hand-box panel (2) using one 1/2-inch hex bolt (3).
2. Bolt valve (4) to mounting plate with two 3/8-by-3/4-inch hex bolts (5) and lock washers (6).
3. Install elbow fittings in cylinder ports.
4. Use hoses provided to connect valve ports to cylinders. Refer to Figure 5 for port connections.
5. Connect your own hydraulic hoses to ports on front of valve. Route hoses to tractor outlets.
6. Using orange cable tie, secure plastic hose label to hydraulic hoses near tractor outlets. See Figure 4.



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Figure 4

Install Hose Label

7. Proceed with "**Bleeding Marker Hydraulics**," page 3.

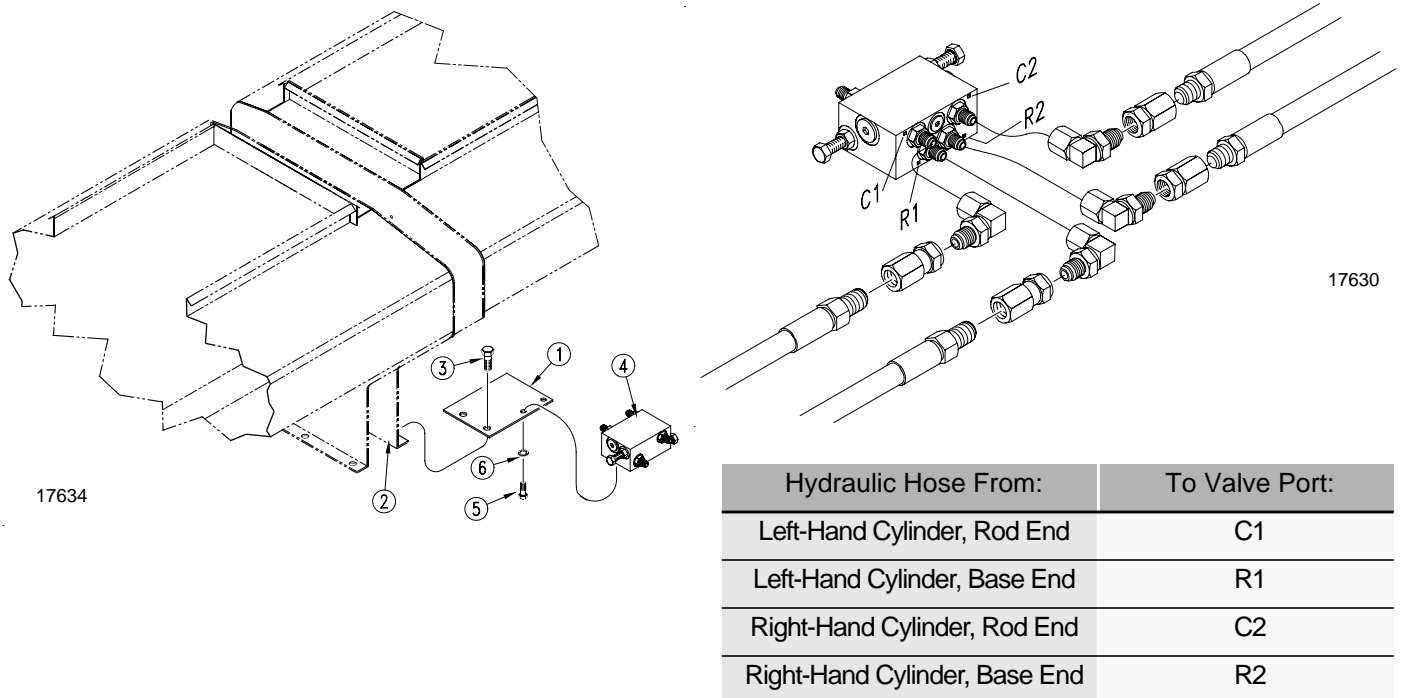


Figure 5
Hydraulic Assembly, Markers with Sequence Valve

Bleeding Marker Hydraulics



CAUTION!

You may be injured if hit by a folding or unfolding marker. Markers may fall quickly and unexpectedly if the hydraulics fail. Never allow anyone near the drill when folding or unfolding the markers.



WARNING!

Escaping fluid under pressure can have sufficient pressure to penetrate the skin. Check all hydraulic lines and fittings before applying pressure. Fluid escaping from a very small hole can be almost invisible. Use paper or cardboard, not body parts, and wear heavy gloves to check for suspected leaks. If injured, seek medical assistance from a doctor that is familiar with this type of injury. Foreign fluids in the tissue must be surgically removed within a few hours or gangrene will result.

1. Check that tractor hydraulic reservoir is full.
2. With both markers lowered into field position, loosen hydraulic-hose fittings at rod and base ends of marker cylinders. If applicable, loosen fittings on back side of sequence valve.

IMPORTANT: Never bleed an O-ring fitting. Instead, bleed a nearby pipe or JIC fitting.

3. With tractor idling, activate tractor hydraulic valve until oil seeps out around a loosened fitting. Tighten that fitting.

IMPORTANT: JIC fittings do not require high torque. JIC and O-ring fittings do not require sealant. Always use liquid pipe sealant when adding or replacing pipe-thread fittings. To avoid cracking hydraulic fittings from over tightening, do not use plastic sealant tape.

4. Reactivate tractor hydraulic valve until oil seeps out around another loosened fitting. Tighten that fitting. Repeat process until all loosened fitting have been bled and tightened.
5. Adjust marker folding to a safe speed. Refer to *Marker Adjustment, "Adjustments,"* in the operator's manual.

Listing of Parts

113-490A 15-Foot Dual Markers with Sequence

Your Kit Includes:

Qty.	Part No.	Part Description
1	113-180H	LH FIRST SECTION
1	113-188H	RH FIRST SECTION
1	113-191H	LH MARKER BREAKAWAY TUBE
1	113-193H	RH MARKER BREAKAWAY TUBE
2	113-248D	PIN 1 OD X 4.34 USABLE
2	113-312D	FIRST PIVOT SHAFT
2	113-313D	SECOND PIVOT SHAFT
2	113-324D	CYLINDER STOP
4	113-325D	STOP BUSHING
2	113-354D	13' MARKER TUBE 46 1/2 LONG
1	113-458H	L.H. MARKER MOUNT
1	113-459H	R.H. MARKER MOUNT
1	113-467H	LIFT LUG CHANNEL R.H.
1	13-468H	LIFT LUG CHANNEL L.H.
4	113-491D	ADJUST MOUNT SPACER TUBE +
2	113-503H	MARKER DISK ADJUST MOUNT
2	113-564S	2020 MARKER DISC & HUB ASSY
4	800-001C	GREASE ZERK STRAIGHT 1/4-28
4	801-054C	SCREW SET SQ HD 1/2-13X1 GR
8	802-099C	HHCS 1/2-13X3 1/4 GR5
4	802-115C	HHCS 5/16-18X2 GR5
2	802-249C	HHCS 1/2-13X4 1/2 GR5 SPTHD
2	802-253C	HHCS 3/8-16X1 3/4 GR2
2	802-254C	HHCS 5/8-11X5 1/2 GR5
4	803-011C	NUT LOCK 5/16-18 PLT
2	803-013C	NUT LOCK 3/8-16 PLT
2	803-019C	NUT LOCK 1/2-13 PLT
8	803-020C	NUT HEX 1/2-13 PLT
2	803-024C	NUT LOCK 5/8-11 PLT
2	803-036C	NUT HEX JAM 1/2-13 PLT
8	804-015C	WASHER LOCK SPRING 1/2 PLT
16	804-017C	WASHER FLAT 1/2 USS PLT
4	804-029C	WASHER FLAT 1 SAE
4	805-058C	PIN COTTER 3/16 X 2
2	810-205C	CYL 2X20X1.12 ROD (TIE) 1 P
1	113-477M	MANUAL 94 3PT MARKER
1	113-488D	SEQUENCE VALVE MOUNT BRACKE
2	113-507H	MARKER MOUNT SUPPORT WMNT
6	800-035C	CABLE TIE 28 LONG
2	802-014C	HHCS 3/8-16X3/4 GR5
8	803-027C	NUT HEX 3/4-10 PLT
2	804-013C	WASHER LOCK SPRING 3/8 PLT
8	804-023C	WASHER LOCK SPRING 3/4 PLT
4	806-093C	U-BOLT 3/4-10 6 1/32 X 7 3/
1	810-197C	VALVE,SEQUENCE SHOEMAKER
4	811-169C	EL 9/16MJIC 9/16FJIC
4	811-281C	EL 3/8FNPT 9/16MORB
2	811-448C	HH1/4R1 156 3/8MNPT 9/16FJI
2	811-449C	HH1/4R1 176 3/8MNPT 9/16FJI
1	800-300C	CABLE TIE 2 DIA MIN - ORG
1	817-348C	PLASTIC HOSE LABEL

Listing of Parts

113-457A 20-Foot Dual Markers

Your Kit Includes:

Qty.	Part No.	Part Description
2	113-203H	SUPPORT ARM SADDLE - 20'
2	113-223H	MARKER TRANS ARM MOUNT WDMT
2	113-506H	MARKER SADDLE MOUNT ARM WMN
2	113-507H	MARKER MOUNT SUPPORT WMNT
8	800-035C	CABLE TIE 28 LONG
8	803-014C	NUT HEX 3/8-16 PLT
16	803-020C	NUT HEX 1/2-13 PLT
8	803-027C	NUT HEX 3/4-10 PLT
8	804-012C	WASHER FLAT 3/8 SAE PLT
8	804-013C	WASHER LOCK SPRING 3/8 PLT
16	804-015C	WASHER LOCK SPRING 1/2 PLT
8	804-023C	WASHER LOCK SPRING 3/4 PLT
8	806-005C	U-BOLT 1/2-13 X 2 X 3 GR 5
4	806-051C	U-BOLT 3/8-16 X 6 1/32 X 7
4	806-093C	U-BOLT 3/4-10 6 1/32 X 7 +
2	810-058C	VALVE 3/8 NEEDLE
2	811-044C	AD 3/8MNPT
4	811-281C	EL 3/8FNPT 9/16MORB
1	113-477M	MANUAL 94 3PT MARKER
2	811-015C	HH1/4R1 192 3/8MNPT 1/2MNPT
2	811-297C	SP HH1/4R1 212 3/8MNPT-W/AD
1	113-180H	LH FIRST SECTION
1	113-188H	RH FIRST SECTION
2	113-248D	PIN 1 OD X 4.34 USABLE
2	113-312D	FIRST PIVOT SHAFT
2	113-313D	SECOND PIVOT SHAFT
2	113-324D	CYLINDER STOP
4	113-325D	STOP BUSHING
2	113-354D	13' MARKER TUBE 46 1/2 LONG
1	113-458H	L.H. MARKER MOUNT
1	113-459H	R.H. MARKER MOUNT
1	113-467H	LIFT LUG CHANNEL R.H.
1	113-468H	LIFT LUG CHANNEL L.H.
4	113-491D	ADJUST MOUNT SPACER TUBE
2	113-503H	MARKER DISK ADJUST MOUNT
2	113-564S	2020 MARKER DISC & 3HUB A +
2	113-646H	20' MARKER BREAKAWAY
4	800-001C	GREASE ZERK STRAIGHT 1/4-28
4	801-054C	SCREW SET SQ HD 1/2-13X1 GR
8	802-099C	HHCS 1/2-13X3 1/4 GR5
4	802-115C	HHCS 5/16-18X2 GR5
2	802-249C	HHCS 1/2-13X4 1/2 GR5 SPTHD
2	802-253C	HHCS 3/8-16X1 3/4 GR2
2	802-254C	HHCS 5/8-11X5 1/2 GR5
4	803-011C	NUT LOCK 5/16-18 PLT
2	803-013C	NUT LOCK 3/8-16 PLT
2	803-019C	NUT LOCK 1/2-13 PLT
8	803-020C	NUT HEX 1/2-13 PLT
2	803-024C	NUT LOCK 5/8-11 PLT
4	803-036C	NUT HEX JAM 1/2-13 PLT
8	804-015C	WASHER LOCK SPRING 3/8 PLT
16	804-017C	WASHER FLAT 1/2 USS PLT
4	804-029C	WASHER FLAT 1 SAE
4	805-058C	PIN COTTER 3/16 X 2
2	810-205C	CYL 2X20X1.12 ROD (TIE) 1 P
2	800-300C	CABLE TIE 2 DIA MIN - ORG
2	817-348C	PLASTIC HOSE LABEL

Listing of Parts

113-491A 20-Foot Dual Markers with Sequence

Your Kit Includes:

Qty.	Part No.	Part Description
1	113-477M	MANUAL 94 3PT MARKER
2	113-203H	SUPPORT ARM SADDLE - 20'
2	113-223H	MARKER TRANS ARM MOUNT WDMT
1	113-488D	SEQUENCE VALVE MOUNT BRACKE
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1	810-197C	VALVE,SEQUENCE SHOEMAKER
4	811-169C	EL 9/16MJIC 9/16FJIC
4	811-281C	EL 3/8FNPT 9/16MORB
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2	811-451C	HH1/4R1 212 3/8MNPT 9/16FJI
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