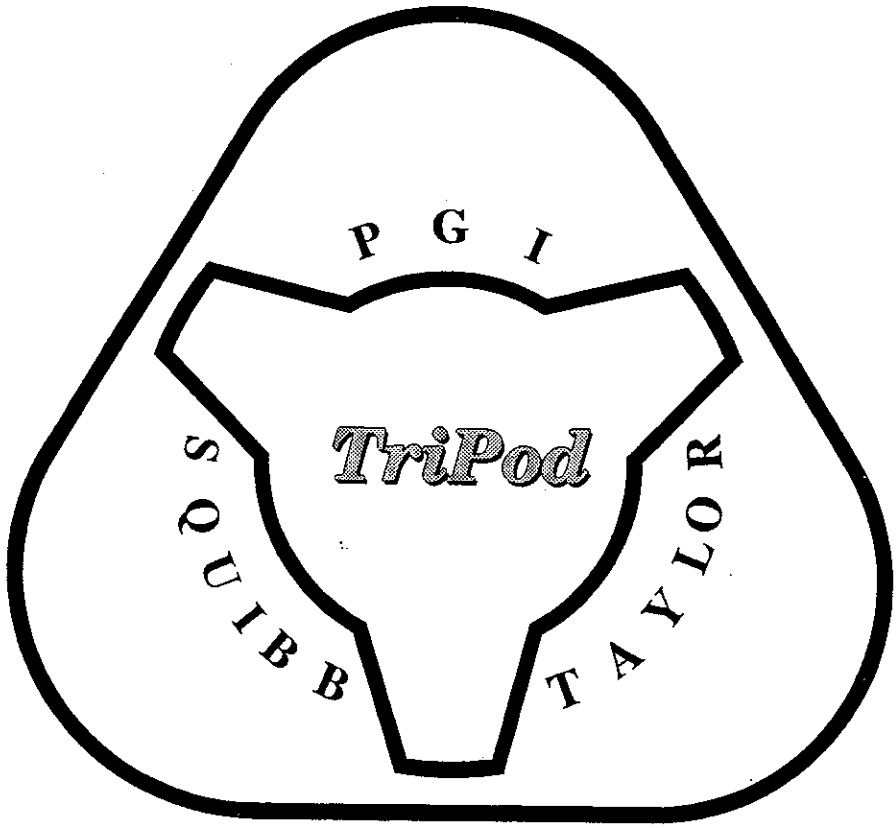
TriPod™

Safety Coupler
For Anhydrous Risers



INSTALLATION & OPERATING INSTRUCTIONS

REV. 3 - 8/94

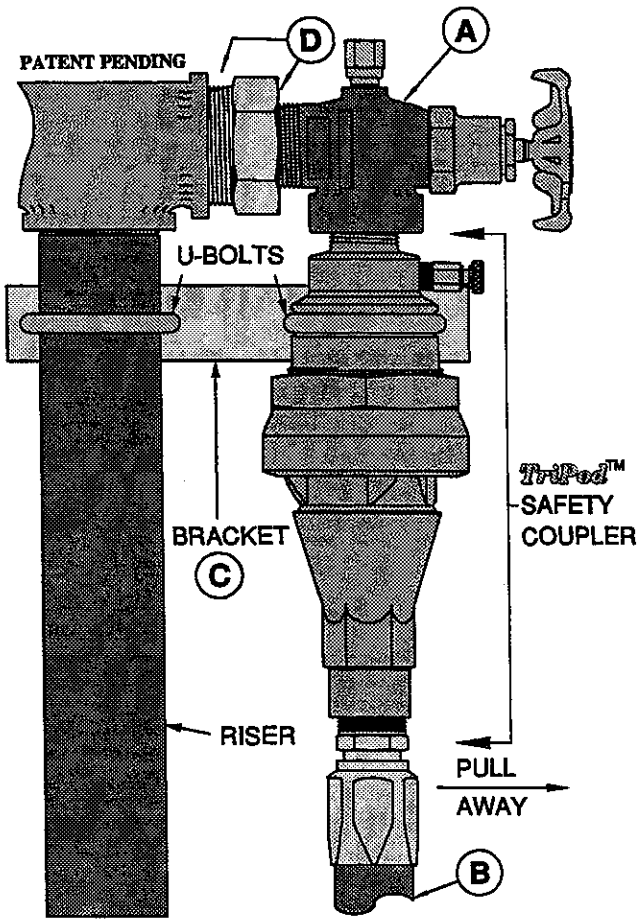
TP1-2019

TriPod™ Safety Coupler For Anhydrous Risers

INSTALLATION & OPERATING INSTRUCTIONS

TriPod™ Safety Coupler

PRINCIPLES OF OPERATION



THE TRIPOD SAFETY COUPLER IS DESIGNED TO PROVIDE PULL-AWAY PROTECTION FOR EACH HOSE AT THE RISER. IT'S NON-DESTRUCTIVE RELEASING MECHANISM WILL OPERATE RELIABLY WITH A PULL-AWAY FORCE IN ANY GENERALLY HORIZONTAL DIRECTION. IN ADDITION, THE FORCE NEEDED TO RELEASE THE COUPLING DOES NOT REQUIRE THAT THE RISER BE GREATLY RIGIDIZED. SO, IN MOST CASES, THE TRIPODS CAN QUICKLY BE INSTALLED IN EXISTING RISER PIPING.

ALL SS CONSTRUCTION AND TEFLON SEATS ENSURE A LONG TROUBLE FREE OPERATING LIFE.

THE TRIPOD IS TYPICALLY INSTALLED BETWEEN THE RISER SHUTOFF VALVE (A) AND THE FILL HOSE (B). A **REQUIRED** SAFETY BRACKET (C) IS USED TO LIMIT THE AMOUNT OF TWIST THAT CAN OCCUR AT CONNECTION POINT (D) DURING A PULL-AWAY. THIS BRACKET MUST **ALWAYS** BE INSTALLED TO ASSURE PROPER OPERATION OF THE TRIPOD IN A PULL-AWAY. THE TRIPOD MUST BE KEPT IN A VERTICAL POSITION FOR A HORIZONTAL PULL TO RELEASE THE COUPLING.

FIGURE 1 SHOWS A TYPICAL TRIPOD IN CROSS SECTION. THE TRIPOD HOUSING (A) IS TIGHTENED INTO THE RISER VALVE OUTLET (B). THE HOUSING HAS AN INTEGRAL BLEEDER (C) WHICH IS USED TO VENT TRAPPED LIQUID AFTER A PULL-AWAY. THE HOUSING IS THREADED AT (E) TO RECEIVE THE CATCH NUT (D) WHICH IS TIGHTENED IN A UPWARD DIRECTION TO TRAP THE TRIPOD SWIVEL ASSEMBLY (F) INTO SEALING ENGAGEMENT WITH THE HOUSING ASSEMBLY.

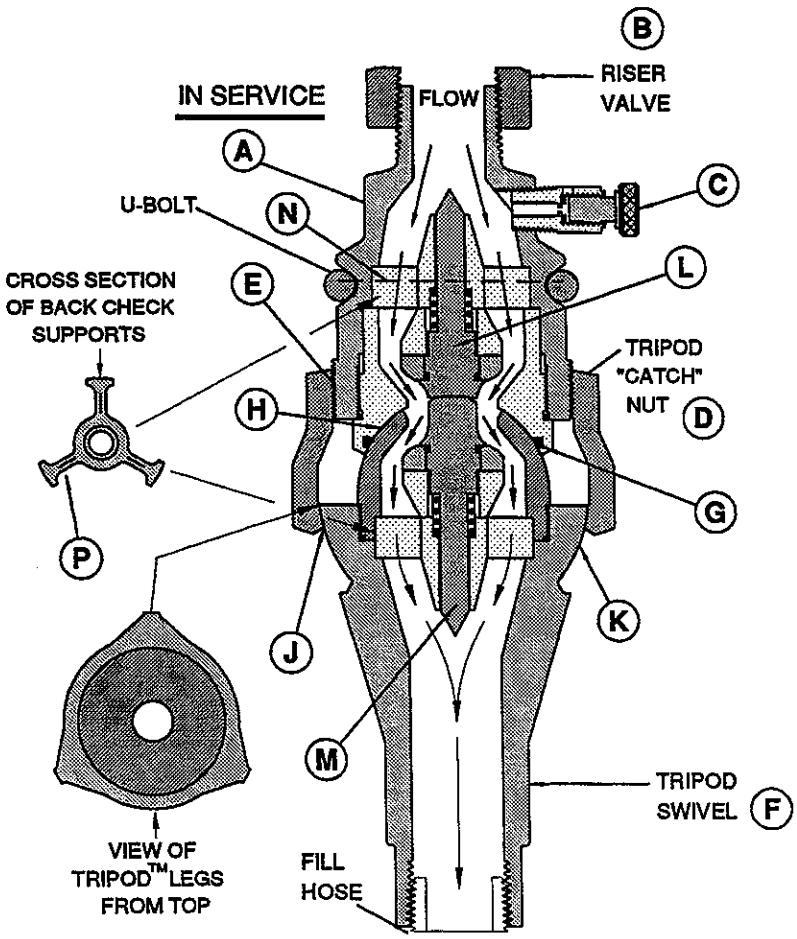


FIGURE 1

THE HOUSING TO TRIPOD SWIVEL ASSEMBLY SEAL IS MADE BY O-RING (G) WHICH IS LOCATED ON A HARDENED STAINLESS STEEL BALL SOCKET JOINT (H). THE FEMALE HALF IS PART OF THE HOUSING ASSEMBLY AND THE MALE HALF IS PART OF THE TRIPOD SWIVEL ASSEMBLY. AS THE CATCH NUT IS THREADED ONTO THE HOUSING IT "CATCHES" OR CONTACTS THE OUTER TIP OF EACH OF THE THREE TRIPOD LEGS AT AREA (J) WHICH PULLS THE TRIPOD SWIVEL INTO CONTACT WITH THE HOUSING.

THE EXTENT TO WHICH THE CATCH NUT IS TIGHTENED WILL LARGELY DETERMINE THE FORCE REQUIRED (IN A HORIZONTAL DIRECTION) TO DISENGAGE THE COUPLING.

THE OUTER SURFACE OF THE TRIPOD SWIVEL LEGS (K) AND THE INNER SURFACE OF THE CATCH NUT AT (J) ALSO DEFINES A BALL SOCKET THAT IS LARGER THAN THE INNER SEALING BALL SOCKET. THE CENTER POINT OF BOTH SOCKETS ARE IDENTICAL WHICH ALLOWS THE TRIPOD SWIVEL TO ROTATE WITHOUT JAMMING UNTIL DISENGAGED FROM THE CATCH NUT.

THE CENTER SECTION OF THE TRIPOD CONTAINS TWO SPRING LOADED BACKCHECKS (L) AND (M). THEY HOLD EACH OTHER OPEN IN NORMAL OPERATION AND ARE SUSPENDED IN THE FLOW STREAM BY BACK CHECK SUPPORT MEMBERS (N) AND (P) WHICH HAVE THIN LEGS TO SUPPORT THE BACK CHECK VALVES YET ALLOW FLOW TO OCCUR AROUND THEM AS SHOWN.

THE MECHANICAL OPERATION OF THE TRIPOD DURING RELEASE IS SHOWN IN FIGURE 2. A RELEASE IS INTIATED WHEN A HORIZONTAL FORCE AT POINT (A) (DUE TO A PULL AWAY) OVERCOMES THE FRICTIONAL FORCES AT BOTH THE INNER AND OUTER BALL SOCKETS (B) AND (C) RESPECTIVELY. THE AMOUNT OF FRICTIONAL FORCE PRESENT WAS DETERMINED BY THE TIGHTNESS OF THE CATCH NUT.

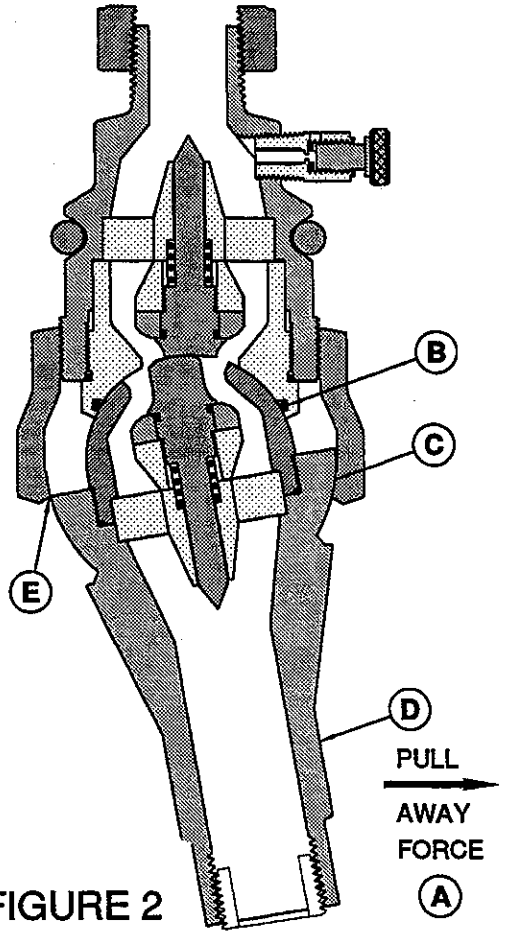


FIGURE 2

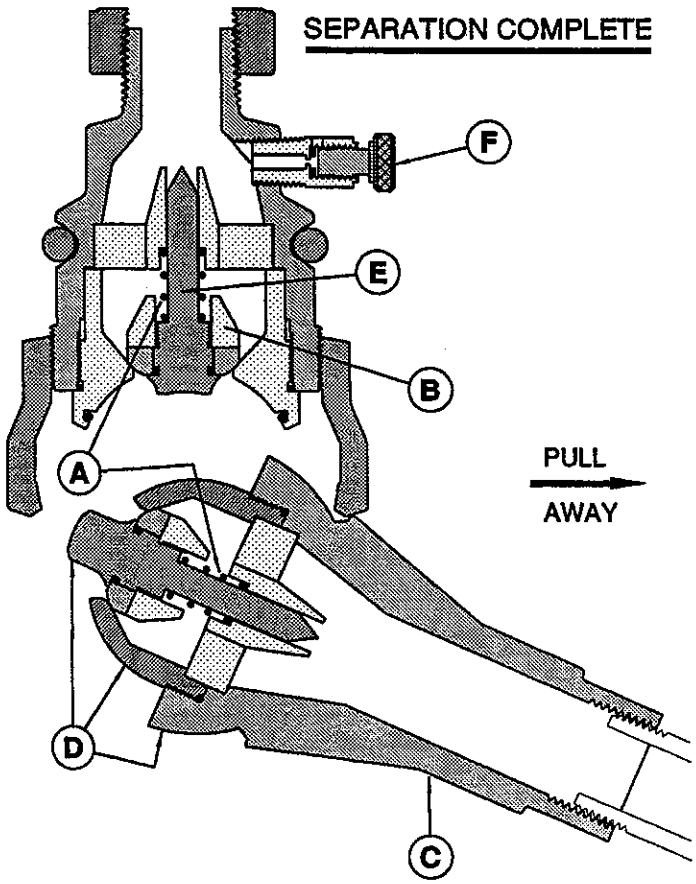


FIGURE 3

AS THE TRIPOD SWIVEL PIVOTS, ONE OR TWO OF THE THREE TRIPOD LEGS TRAVELS DOWN TOWARD THE LIP (E) OF THE CATCH NUT. WHILE THE ROTATION IS OCCURING THE O-RING ON THE INNER BALL SOCKET (B) MAINTAINS THE PRODUCT SEAL AND WILL CONTINUE TO DO SO UNTILL RELEASE OCCURS. EVENTUALLY ONE OR TWO LEGS (DEPENDING ON - PULLAWAY DIRECTION) ROTATE PAST LIP (E) AND THE TRIPOD SWIVEL ASSEMBLY WILL DROP FREE OF THE HOUSING AND CATCH NUT ASSEMBLY.

AFTER RELEASE OCCURS THE TWO BACK CHECK VALVES WILL CLOSE VERY QUICKLY TO MINIMIZE PRODUCT RELEASE AS SHOWN IN FIGURE 3. THE BACK CHECKS AND ASSIST SPRINGS (A) ARE STAINLESS STEEL AND THE SEALING SEATS ARE TEFLON TO ENSURE PROPER OPERATION ON A PULLAWAY. THE TRIPOD SWIVEL WITH THE BACK CHECK CLOSED REMAINS ATTACHED TO THE FILL HOSE AND FOLLOWS THE PULLAWAY VEHICLE UNTIL STOPPED. DAMAGE TO THE TRIPOD SWIVEL IS MINIMIZED BY HARDENING THE EXPOSED AREAS (D) ON THE SWIVEL.

AFTER PROPER BLEED DOWN OF THE SYSTEM AS DESCRIBED UNDER "OPERATING INSTRUCTIONS" THE SWIVEL AND HOSE ARE QUICKLY RECONNECTED TO THE HOUSING ASSEMBLY TO PUT THE RISER BACK IN OPERATION.

OPERATING INSTRUCTIONS

A- RECONNECTION AFTER A PULL AWAY

1. - CLOSE THE WITHDRAWAL VALVE AND VAPOR RETURN VALVE ON THE NURSE TANK
2. - CLOSE THE HOSE END VALVES ON BOTH THE LIQUID AND VAPOR LINES WHICH ARE STILL ATTACHED TO THE NURSE TANK.
3. - DISCONNECT THE LIQUID AND VAPOR LINES FROM THE NURSE TANK IN A NORMAL FASHION.

> **CAUTION:** BOTH THE LIQUID AND VAPOR LINES ARE FULL OF PRODUCT WHICH MUST BE SAFELY BLED OFF.

4. - TAKE THE LIQUID AND VAPOR HOSE ASSEMBLY TO A WATER TANK AND BLEED OFF THE TRAPPED PRODUCT BY OPENING THE HOSE END VALVES SLOWLY WHERE THE VALVE IS HELD AT LEAST 12 INCHES UNDER WATER.

> **CAUTION:** AFTER EACH HOSE IS BLED OFF, LEAVE THE HOSE END VALVES OPEN UNTIL AFTER THE TRIPOD IS RECONNECTED. IF THE VALVE IS CLOSED, PRESSURE WILL BUILD AGAIN IN THE LOOSE HOSE ASSEMBLY AND SPIT ANHYDROUS WHEN THE BACK CHECK IS OPENED LATER DURING RECONNECTION.

5. - INSPECT THE NURSE TANK VALVES, HOSE END VALVES AND HOSE FOR SIGNS OF DAMAGE OR CRACKING.

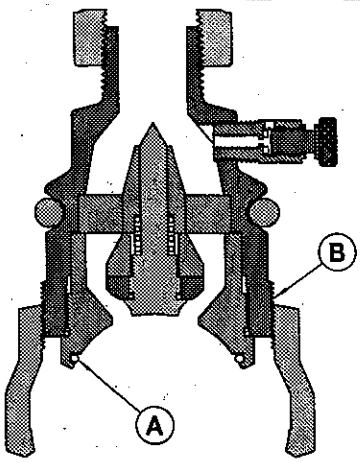
> **CAUTION:** PAY CAREFUL ATTENTION TO CRACKS THAT MAY OCCUR IN THE NECK OF THE MALE ACME CONNECTOR ON THE NURSE TANK VALVES. IF ANY CRACKING IS OBSERVED - DO NOT USE THE TANK.

6. - CLOSE THE RISER SHUTOFF VALVES ON ANY DISCONNECTED TRIPOD. THIS WILL TRAP VAPOR OR LIQUID BETWEEN THE SHUTOFF VALVE AND THE CLOSED BACK CHECK VALVE IN THE TRIPOD HOUSING (Ⓔ ON FIGURE 3)

7. - BLEED THE TRAPPED ANHYDROUS BY OPENING BLEEDER Ⓕ ON FIGURE 3.

> **CAUTION:** LEAVE THE BLEEDER OPEN UNTIL AFTER TRIPOD RECONNECTION, OTHERWISE PRESSURE WILL BUILD UP IN THE CAVITY AND SPIT ANHYDROUS WHEN THE BACK CHECK IS OPENED DURING RECONNECTION.

8. - INSPECT FOR THE PRESENCE OF THE SEALING O-RING (A) IN FIGURE 4. IF IT IS MISSING OR CUT, REPLACE IT NOW.



PICTURE OF HOUSING WITH CATCH NUT SCREWED DOWN

FIGURE 4

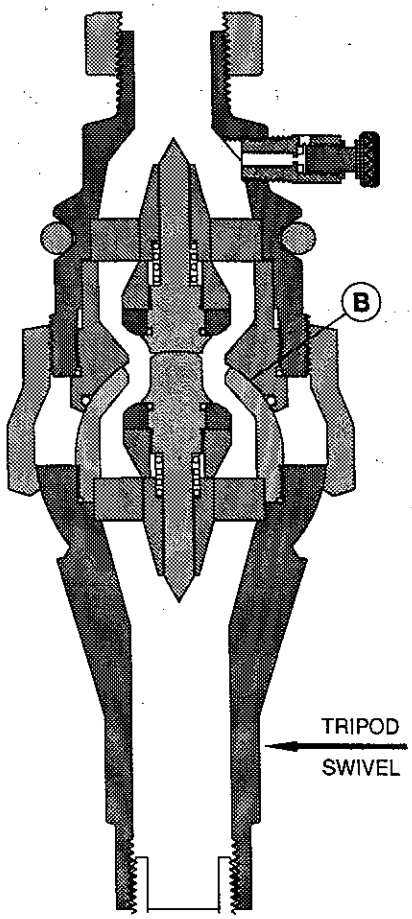


FIGURE 5

NOTE: ON A DISCONNECT, IT IS NOT UNUSUAL FOR THE SEALING O-RING (A) IN FIGURE 4 TO BLOW OUT OF THE RING GROOVE AND LODGE AT THE BASE (B) OF THE TRIPOD SWIVEL MALE BALL AS SHOWN IN FIGURE 5.

9. - SCREW THE CATCH NUT DOWN (OFF) UNTILL THE INTERNAL THREADS ARE SLIGHTLY EXPOSED AS SHOWN IN FIGURE 4 (B).

NOTE: THE CATCH NUT IS SCREWED DOWN TO THIS POSITION SO THE BACK CHECKS WILL NOT INTERFERE WITH EACH OTHER WHEN THE SWIVEL IS HUNG IN THE CATCH NUT.

10. - TAKE THE TRIPOD SWIVEL WITH HOSE ATTACHED AND HANG IT IN THE CATCH NUT AS SHOWN IN FIGURE 5 .

11. - WHILE HOLDING THE TRIPOD SWIVEL, SCREW THE CATCH NUT ONTO THE HOUSING (UP) UNTIL HAND TIGHT.

NOTE: BE SURE TO HOLD THE SWIVEL IN A VERTICAL POSITION WHILE RUNNING UP THE CATCH NUT OR THE SWIVEL WILL DISENGAGE.

12. - TIGHTEN THE CATCH NUT 1/8 TURN WITH A PIPE WRENCH ON IT'S WRENCH AREA AS SHOWN IN FIGURE 6.

13. - GRAB THE HOSE FITTING BY HAND AND TRY TO MOVE THE TRIPOD SWIVEL. IF IT CAN BE MOVED BY HAND, TIGHTEN THE CATCH NUT 1/16 TURN OR LESS AND TRY AGAIN.

NOTE: STRIKING THE HOSE FITTING WITH THE HEEL OF YOUR HAND TO SEE IF IT WILL MOVE, IS ALSO A TECHNIQUE THAT CAN BE USED.

CAUTION: DO NOT OVERTIGHTEN THE CATCH NUT. IT MUST BE TIGHT ENOUGH TO NOT DISENGAGE WITH NORMAL HOSE HANDLING BUT SHOULD NOT BE TIGHTENED PAST THAT POINT.

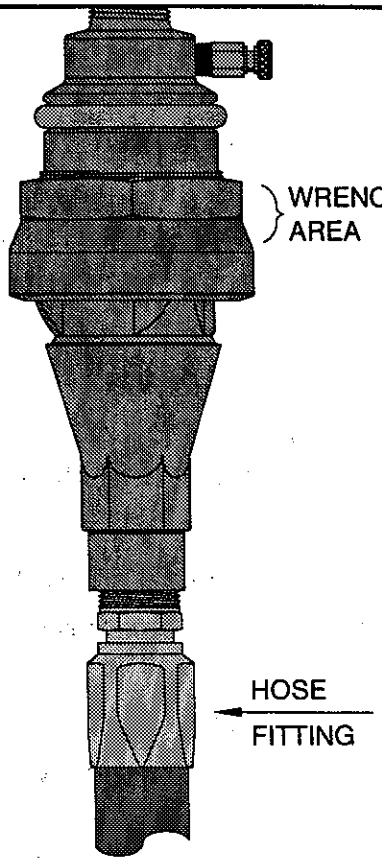


FIGURE 6

NOTE: IF YOU ARE UNSURE ABOUT THE TIGHTNESS, SIMPLY TEST WHAT YOU HAVE DONE BY WHIPPING THE HOSE ARROUND TO SIMULATE HANDLING AND THEN PULL ON THE HOSE TO TEST THE EASE OF DISCONNECT. RECONNECT, TIGHTEN AND DO A MANUAL PULL-AWAY AS MANY TIMES AS NEEDED. NO HARM IS DONE BY OPERATING THE TRIPOD.

14. - MAKE SURE THE TRIPOD SWIVEL IS STRAIGHT TO THE EYE IN THE HOUSING. IF NOT-LOOSEN THE CATCH NUT SLIGHTLY. TAP IT STRAIGHT AND RETIGHTEN THE NUT TO IT'S PREVIOUS POINT.

15. - THE HOSE END VALVE AND HOUSING BLEEDER SHOULD NOW BE CLOSED.

16. - OPEN THE RISER SHUTOFF VALVE SLOWLY AND CHECK SYSTEM FOR LEAKS. IF ANY LEAKS ARE OBSERVED THEY MUST BE CORRECTED AT THIS TIME. USE THE PROCEDURE DESCRIBED BELOW IN "DISCONNECT FOR OFF-SEASON STORAGE" TO DISCONNECT THE TRIPOD FOR LEAK REPAIR.

B- DISCONNECT FOR OFF-SEASON STORAGE

1. - SHUT OFF THE RISER VALVES

2. - BLEED THE VAPOR HOSE DOWN USING THE HOUSING BLEEDER. THE LIQUID HOSE SHOULD BE BLED **INTO A WATER TANK** AS DESCRIBED IN STEP 4 OF THE OPERATING INSTRUCTIONS.

3. - AFTER BLEED DOWN - LEAVE THE BLEEDER OPEN AND OPEN THE HOSE END VALVES.

4. - DO A MANUAL PULL-AWAY TO DISCONNECT THE TRIPOD OR LOOSEN THE CATCH NUT AND DISCONNECT THE TRIPOD SWIVEL BY HAND.

CAUTION: WHEN HOSE ASSEMBLIES ARE STORED IN THE OFF-SEASON, THE HOSE END VALVES SHOULD BE LEFT OPEN TO PREVENT PRESSURE BUILDUP IN THE ASSEMBLY.

NOTE: THERE IS NO NEED TO KEEP TRIPOD HOUSINGS AND SWIVELS MATCHED AS RECEIVED FROM THE FACTORY. ANY PARTICULAR SIZE SWIVEL WILL WORK ON ANY SAME SIZED HOUSING.

5.- REMOVE THE CATCH NUT AND LUBRICATE THE THREADS WITH A GOOD WEATHER RESISTANT HEAVY GREASE. SCREW THE CATCH NUT BACK ONTO THE HOUSING AND BACK TIGHTEN WITH A WRENCH SUFFICIENTLY TO PREVENT REMOVAL BY HAND. THIS IS TO GUARD AGAINST OFF SEASON THEFT OF THE CATCH NUT.

6.- CLOSE THE HOUSING BLEEDER

INSTALLATION INSTRUCTIONS

A- DETERMINE PROPER TRIPOD TO USE

PROPERLY INSTALLED RISER PIPING MUST HAVE AN EXCESS FLOW VALVE INSTALLED TO PROTECT EACH LIQUID AND VAPOR HOSE.

THE FLOW CAPACITY OF A TRIPOD INSTALLED TO PROTECT A HOSE MUST EXCEED THE RATING OF THE EXCESS FLOW VALVE PROTECTING THAT HOSE.

CAUTION: THE FLOW CAPACITY OF A TRIPOD INSTALLED TO PROTECT A HOSE MUST EXCEED THE RATING OF THE EXCESS FLOW VALVE PROTECTING THAT HOSE.

TRIPODS CURRENTLY COME IN 3 MODELS:

MODEL	FLOW CAPACITY
T55	55 GPM OF NH_3 AT 10 PSI DIFFERENTIAL
T77	77 GPM OF NH_3 AT 10 PSI DIFFERENTIAL
T126	126 GPM OF NH_3 AT 10 PSI DIFFERENTIAL

NOTE: THE TRIPOD MODEL NUMBER IS STAMPED ON THE HOUSING FLAT NEXT TO THE BLEEDER VALVE.

THE T55 IS TYPICALLY USED FOR THE 1" VAPOR RETURN HOSE.

THE T77 IS TYPICALLY USED ON 1" LIQUID LINES ALONG WITH A SQUIBB TAYLOR AL477 OR ITS EQUIVALENT.

THE T126 IS TYPICALLY USED ON 1 1/4" LIQUID LINES ALONG WITH A SQUIBB TAYLOR AL479 OR ITS EQUIVALENT.

B- DETERMINE RISER TYPE

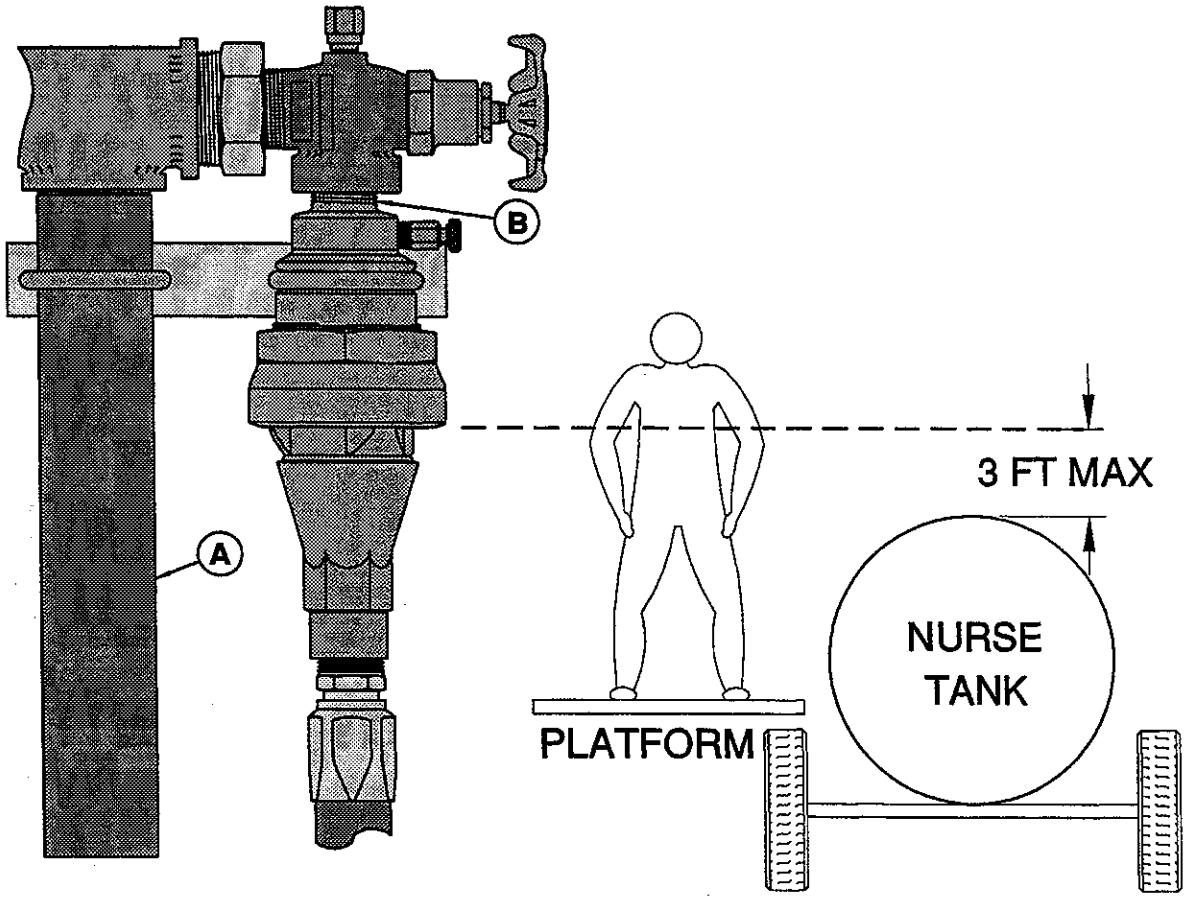
REVIEW THE FIVE RISER TYPES IN THE " RISER DRAWINGS" SECTION TO FIND THE RISER TYPE FOR YOUR INSTALLATION.

THE RISER PIPING AS DRAWN USES SHORT COUPLINGS FOR MOST CONNECTIONS. DISREGARD COUPLING LENGTH WHEN DETERMINING RISER TYPE. LOOK ONLY AT THE RISER "CONFIGURATION" TO DETERMINE IT'S TYPE.

CAUTION: IF YOU CANNOT IDENTIFY YOUR RISER AS ONE OF THE 5 TYPES SHOWN DO NOT PROCEED. CONTACT THE FACTORY BY FAX WITH A SKETCH OF YOUR RISER. INCLUDE YOUR NAME, PHONE NO. AND FAX NUMBER (IF AVAIL). CONTACT: BOB WARD
PHONE 1-800-231-0233 OUTSIDE TX.
FAX 1-713-744-9892

C- ALLOWABLE MOUNTING HEIGHT

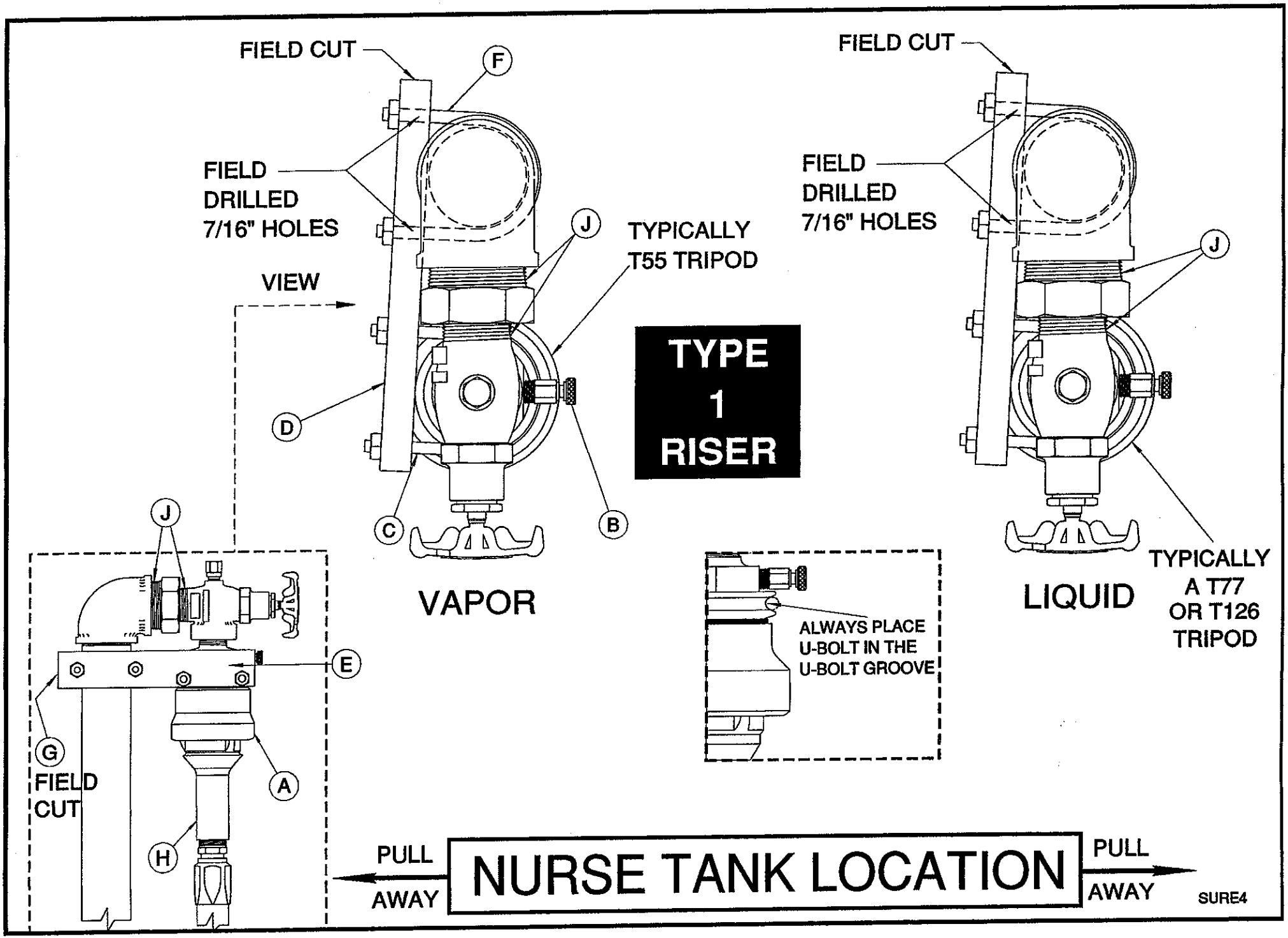
THE TRIPOD PIVOT POINT, WHICH IS THE BOTTOM OF THE CATCH NUT, SHOULD NOT BE MORE THAN 3 FEET ABOVE THE NURSE TANK VALVES.



IF THE RISER DOES NOT MEET THIS REQUIREMENT EITHER:

1. - REDUCE THE RISER PIPE (A) HEIGHT; OR
2. - LOWER THE TRIPOD DOWN TO THE DESIRED HEIGHT BY INSTALLING A NIPPLE AT POINT (B) ABOVE.

SAFETY RECOMENDATION: KEEP THE TRIPOD PIVOT POINT BELOW CHEST HIGH TO THE PLATFORM OPERATORS. ON A PULLAWAY THE COUPLING DOES VENT SOME LIQUID AND VAPOR AS THE BACK CHECKS CLOSE.


FIELD CUT
F
FIELD
DRILLED
7/16" HOLES
J
TYPICALLY
T55 TRIPOD
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D
C
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TYPE
1
RISER
FIELD CUT
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7/16" HOLES
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TYPICALLY
A T77
OR T126
TRIPOD
LIQUID
J
E
G
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CUT
A
H
ALWAYS PLACE
U-BOLT IN THE
U-BOLT GROOVE
PULL
AWAY
NURSE TANK LOCATION
PULL
AWAY
SURE4

D- TRIPOD AND BRACKET INSTALLATION

TYPE 1 RISER - (REFER TO TYPE 1 RISER DRAWING)

1. - CLOSE ALL 3 RISER VALVES, BLEED HOSE CONTENTS OFF UNDER WATER AND REMOVE THE LIQUID VAPOR HOSES FROM THE RISER VALVES.
2. - TEFLON TAPE THE MALE THREADS ON THE T55 TRIPOD Ⓐ AND INSTALL IT WRENCH TIGHT WITH THE HOLE FOR THE BLEEDER Ⓑ TO THE RIGHT.
3. - INSTALL AND ADJUST THE BLEEDER SO THE BLEED PORT POINTS AWAY FROM THE OPERATOR AND LEAVE IT OPEN.
4. - LOOSELY INSTALL SUPPLIED U-BOLT Ⓒ AND FACTORY DRILLED BAR Ⓓ AS SHOWN IN THE TYPE 1 RISER DRAWING. THE FLAT SIDE Ⓔ OF THE BAR MUST BE UP, OR THE CATCH NUT WILL INTERFERE LATER. WITH THE LONG BAR HELD IN PLACE, MARK THE BAR FOR HOLE DRILLING BY HOLDING U-BOLT Ⓕ TO THE BAR TO MARK THE DRILL HOLE LOCATIONS. ALSO MARK THE BAR FOR CUTOFF SEVERAL INCHES OUT PAST THE RISER AT Ⓖ.

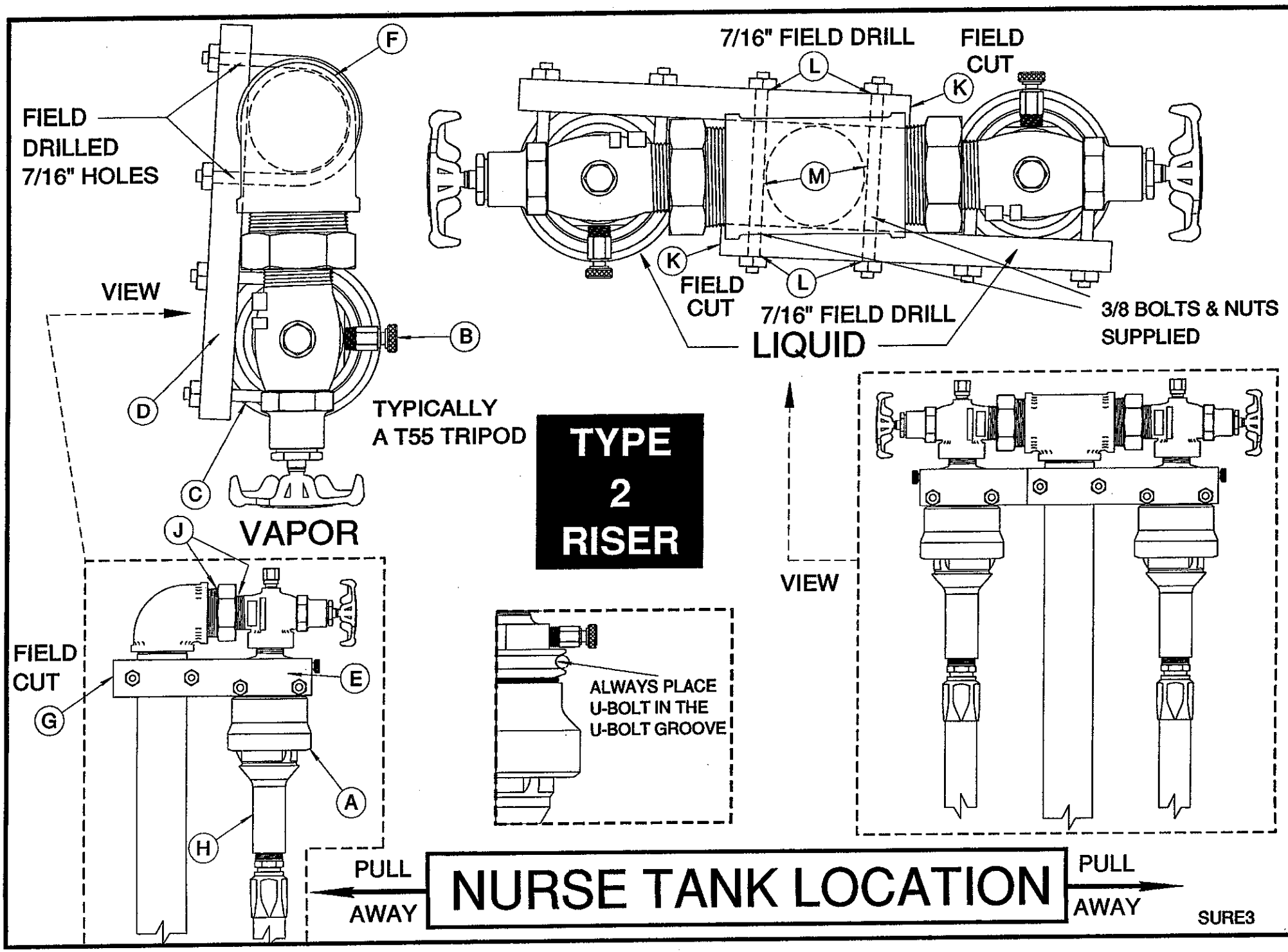
CAUTION: THE SAFETY BRACKET MUST BE INSTALLED TO LIMIT PIVOTING AT POINT Ⓙ IN THE PIPING ASSEMBLY.

5. - SHOP DRILL TWO 7/16 HOLES FOR THE U-BOLT WHERE MARKED AND CUT THE BAR OFF AT Ⓖ AS MARKED.

WARNING: IF THE BRACKET BAR SUPPLIED WILL NOT REACH FROM THE TRIPOD TO THE RISER PIPE THAT MEANS THE PIPE OR COUPLINGS AT Ⓙ ARE TOO LONG. SHORTEN THE PIPE OR COUPLINGS SO THAT THE BAR SUPPLIED CAN BE INSTALLED.

6. - INSTALL THE DRILLED BAR AS SHOWN USING LOCK WASHERS AND FULLY TIGHTEN THE U-BOLT NUTS.

CAUTION: HIGH STRENGTH U-BOLTS ARE SUPPLIED WITH THIS UNIT. DO NOT SUBSTITUTE COMMON U-BOLTS FOR REPLACEMENTS.


FIELD DRILLED 7/16" HOLES
F
B
D
C
VIEW
TYPICALLY A T55 TRIPOD
VAPOR
7/16" FIELD DRILL
FIELD CUT
L
K
M
K
FIELD CUT
L
7/16" FIELD DRILL
3/8 BOLTS & NUTS SUPPLIED
LIQUID
TYPE 2 RISER
VIEW
J
FIELD CUT
G
E
A
H
ALWAYS PLACE U-BOLT IN THE U-BOLT GROOVE
PULL AWAY
NURSE TANK LOCATION
PULL AWAY
SURE3

7. - TAPE AND CONNECT THE TRIPOD SWIVEL ASSEMBLY Ⓗ TO THE HOSE FITTING, AND OPEN THE HOSE END VALVE.

8. - PLACE THE VAPOR TRIPOD IN SERVICE BY CONTINUING FROM STEP 8-PAGE 6 UNDER "RECONNECTION AFTER A PULL-AWAY"

9. - INSTALL AND PLACE THE T77 OR T126 TRIPOD IN THE LIQUID LINE USING EXACTLY THE SAME PROCEDURE AS WAS JUST COMPLETED TO INSTALL THE VAPOR (T55) TRIPOD.

TYPE 2 RISER - (REFER TO TYPE 2 RISER DRAWING)

1. - INSTALL THE VAPOR TRIPOD EXACTLY AS DESCRIBED ON PAGE 11 STEPS 1 THROUGH 8.

2. - INSTALL THE LIQUID SIDE TRIPOD BRACKETS (BARS) AS SHOWN IN THE TYPE 2 RISER DRAWING.

   EACH TRIPOD IS ALWAYS SUPPLIED WITH A U-BOLT THAT CLOSELY FITS THE U-BOLT GROOVE ON THE TRIPOD AND A BAR PRE-DRILLED FOR THAT U-BOLT SPACING.

NOTE: ALWAYS POSITION BLEEDERS SO THEY VENT AWAY FROM OPERATORS.

CAUTION: THE SAFETY BARS MUST BE INSTALLED TO LIMIT POSSIBLE PIVOTING AT POINT Ⓙ IN THE PIPING ASSEMBLY.

NOTE: WHEN MARKING THE BARS FOR THE FIELD DRILLED 7/16" HOLES AT Ⓛ ON EACH BAR, KEEP THE SPACE Ⓜ BETWEEN THE RISER PIPE AND THE BOLTS Ⓝ TO LESS THAN 1/8".

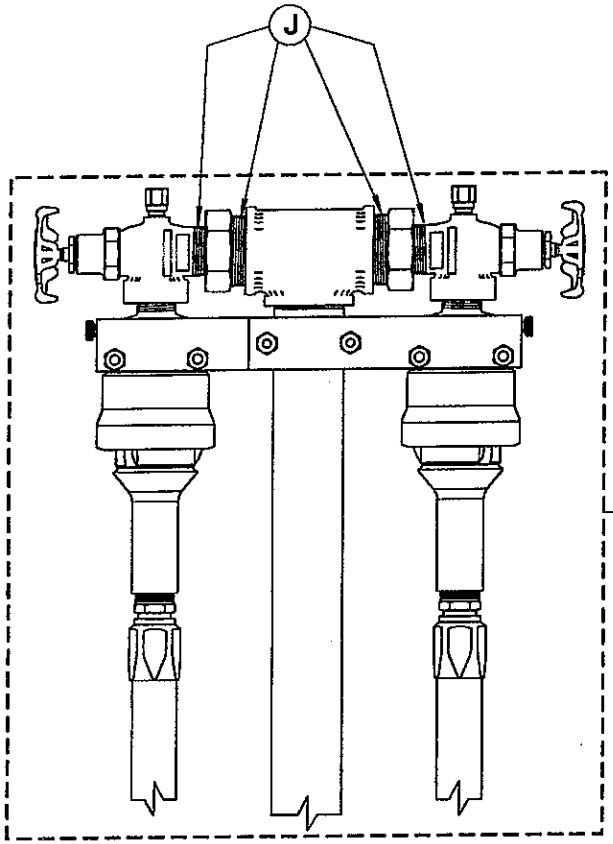
WARNING: IF THE BRACKET BAR SUPPLIED WILL NOT REACH FROM THE TRIPOD TO THE RISER PIPE THAT MEANS THE PIPE OR COUPLINGS AT Ⓙ ARE TOO LONG. SHORTEN THE PIPE OR COUPLINGS SO THAT THE BAR SUPPLIED CAN BE INSTALLED.

3. - PLACE THE LIQUID AND VAPOR TRIPODS IN SERVICE BY CONTINUING FROM STEP 8 ON PAGE 6 UNDER "RECONNECTION AFTER A PULL-AWAY".

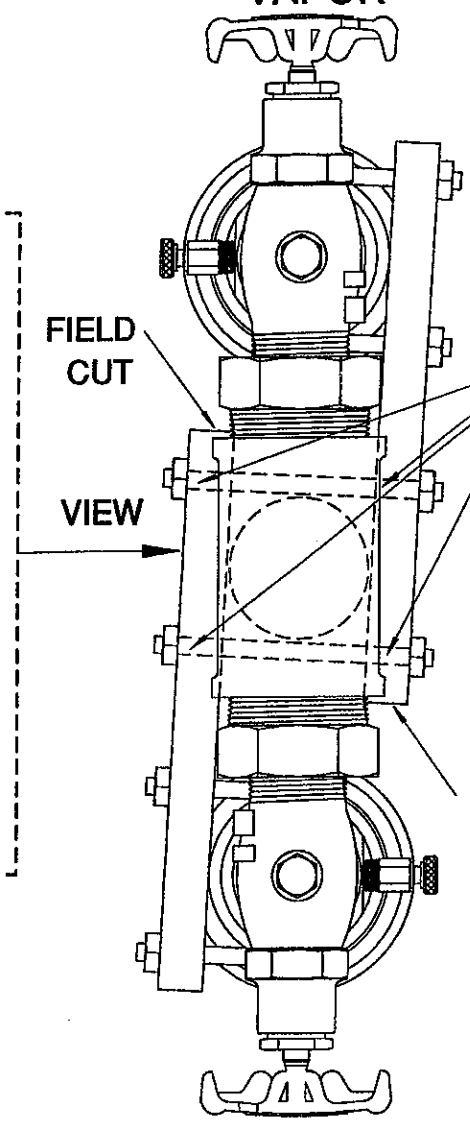
PULL AWAY

NURSE TANK LOCATION

PULL AWAY



VAPOR

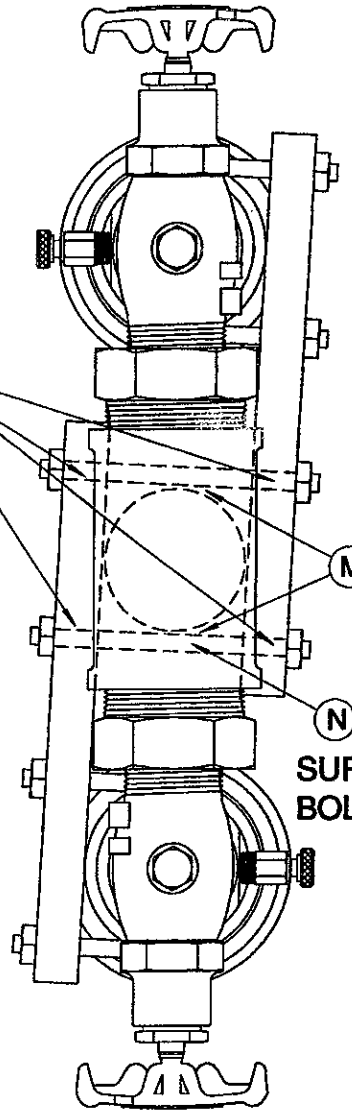


VAPOR

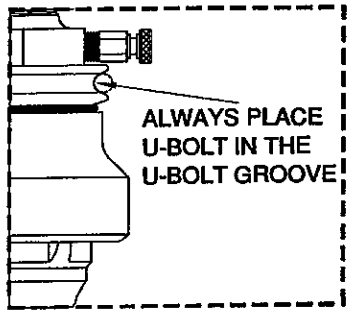
L
FIELD DRILLED 7/16" HOLES

TYPE 3 RISER

LIQUID



LIQUID



PULL AWAY

NURSE TANK LOCATION

PULL AWAY

SURE2

TYPE 3 RISER - (REFER TO TYPE 3 RISER DRAWING)

1. - INSTALL THE LIQUID AND VAPOR TRIPODS AND SUPPORT BARS AS SHOWN IN THE TYPE 3 RISER DRAWING. EACH TRIPOD IS ALWAYS SUPPLIED WITH A U-BOLT THAT CLOSELY FITS THE U-BOLT GROOVE ON THE TRIPOD AND A PRE-DRILLED BAR FOR THAT U-BOLT SPACING.

CAUTION: THE SAFETY BARS MUST BE INSTALLED TO LIMIT POSSIBLE PIVOTING AT POINT (J) IN THE PIPING ASSEMBLY.

NOTE: WHEN MARKING THE BARS FOR THE FIELD DRILLED 7/16" HOLES AT (L) ON EACH BAR, KEEP THE SPACE (M) BETWEEN THE RISER PIPE AND THE BOLTS (N) TO LESS THAN 1/8".

WARNING: IF THE BRACKET BAR SUPPLIED WILL NOT REACH FROM THE TRIPOD TO THE RISER PIPE THAT MEANS THE PIPE OR COUPLINGS AT (J) ARE TOO LONG. SHORTEN THE PIPE OR COUPLINGS SO THAT THE BAR SUPPLIED CAN BE INSTALLED.

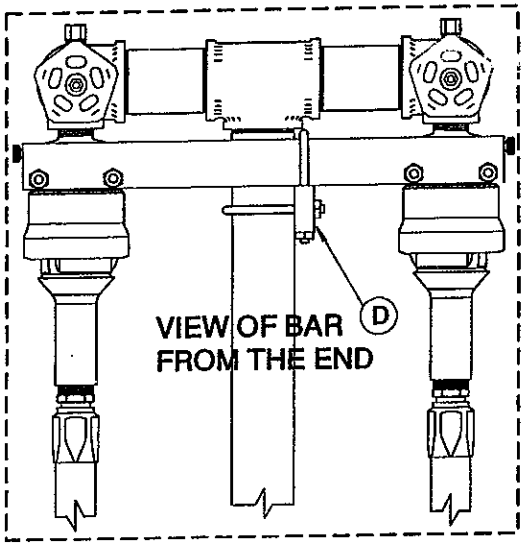
(NOTE: ALWAYS POSITION BLEEDERS SO THEY VENT AWAY FROM OPERATORS.

2. - PLACE THE LIQUID AND VAPOR TRIPODS IN SERVICE BY CONTINUING FROM STEP 8 ON PAGE 6 UNDER "RECONNECTION AFTER A PULL-AWAY)

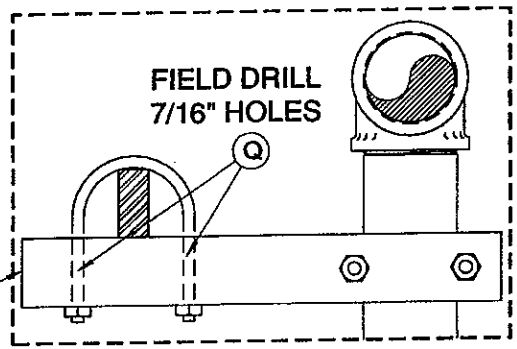
NURSE TANK LOCATION

PULL AWAY

PULL AWAY

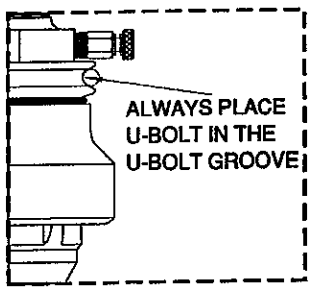


VIEW A-A

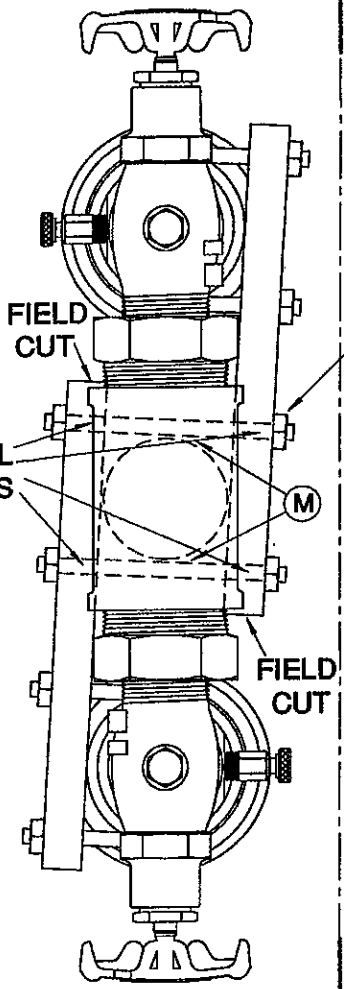


FIELD CUT

VIEW B-B



VAPOR



VAPOR

A

A

VIEW A-A

N SUPPLIED BOLTS

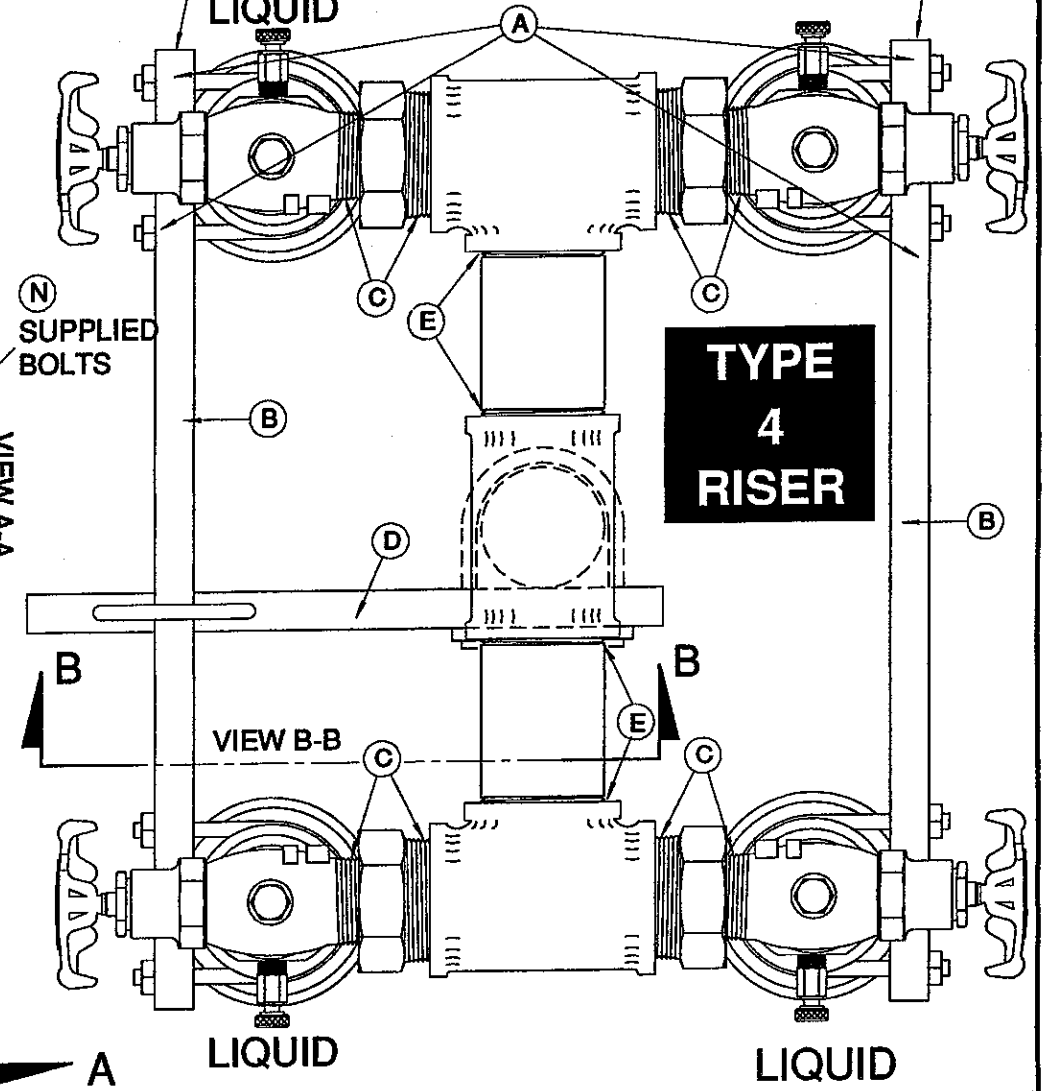
FIELD CUT

FIELD DRILL 7/16" HOLES

LIQUID

LIQUID

FIELD CUT



TYPE 4 RISER

LIQUID

LIQUID

PULL AWAY

PULL AWAY

NURSE TANK LOCATION

SURE

TYPE 4 RISER - (REFER TO TYPE 4 RISER DRAWING)

A TYPE 4 RISER IS IDENTICAL TO A TYPE 5 RISER EXCEPT THE QUAD SECTION OF THE RISER IS ORIENTED DIFFERENTLY TO THE NURSE TANKS.

1. - INSTALL THE TWO VAPOR TRIPODS AS SHOWN IN THE TYPE 4 RISER DRAWING.

NOTE: EACH TRIPOD IS ALWAYS SUPPLIED WITH A U-BOLT THAT CLOSELY FITS THE U-BOLT GROOVE ON THE TRIPOD AND A PRE-DRILLED BAR FOR THAT U-BOLT SPACING.

CAUTION: THE SAFETY BARS MUST BE INSTALLED TO LIMIT POSSIBLE PIVOTING AT POINT (J) IN THE PIPING ASSEMBLY.

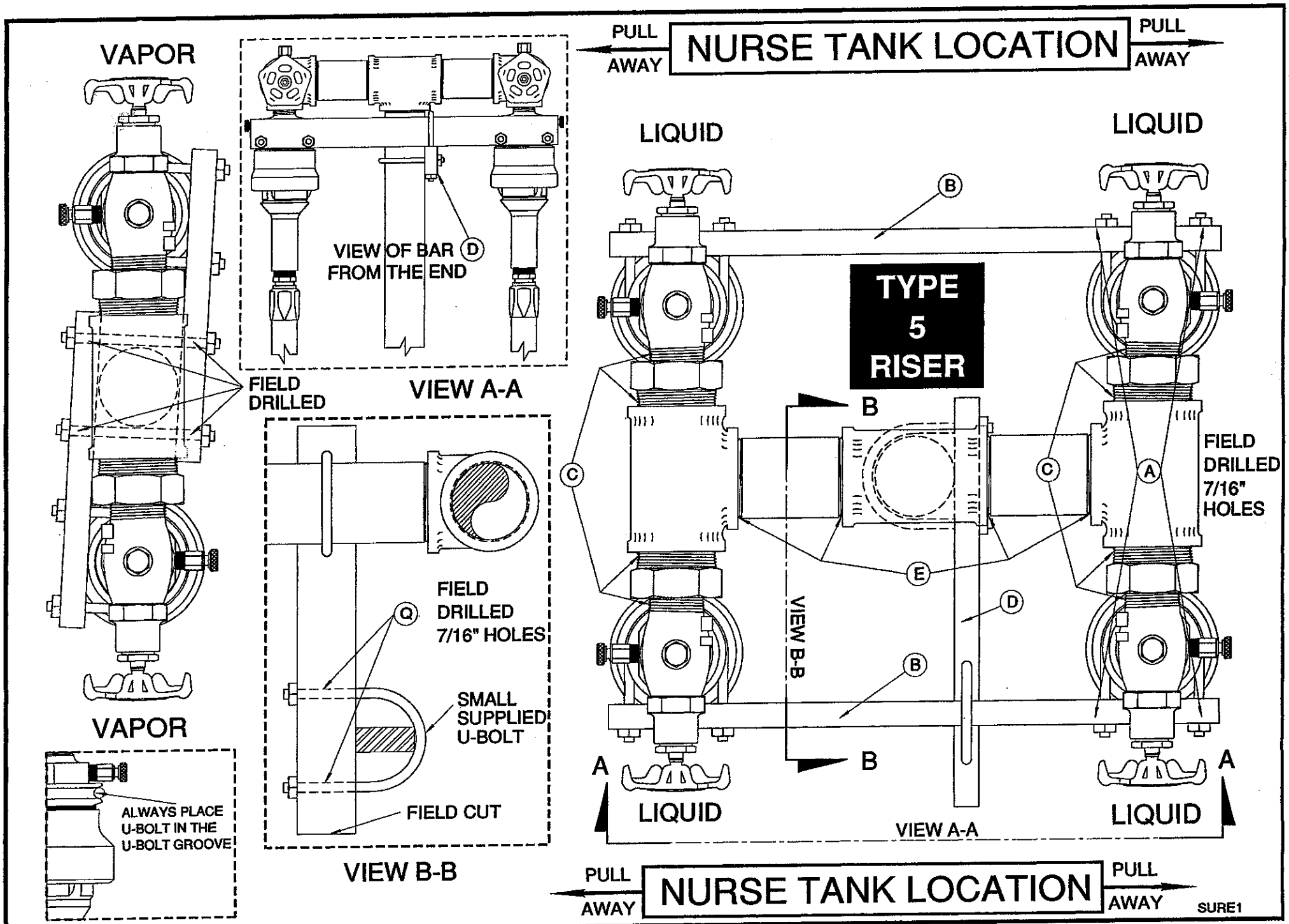
WHEN MARKING THE BARS FOR THE 7/16" HOLES, KEEP THE SPACE (M) BETWEEN THE RISER PIPE AND THE BOLTS (N) TO LESS THAN 1/8".

2. - INSTALL THE LIQUID SIDE TRIPODS AND SUPPORT BARS AS SHOWN IN THE TYPE 4 RISER DRAWING.

WARNING: IF THE BRACKET BAR SUPPLIED WILL NOT REACH FROM THE TRIPOD TO THE RISER PIPE THAT MEANS THE PIPE OR COUPLINGS AT (J) ARE TOO LONG. SHORTEN THE PIPE OR COUPLINGS SO THAT THE BAR SUPPLIED CAN BE INSTALLED.

SINCE A BAR AND BOLTS ARE SUPPLIED WITH EACH TRIPOD, THIS INSTALLATION WILL HAVE ONE BAR AND SEVERAL U-BOLTS AND BOLTS LEFT OVER.

THIS INSTALLATION REQUIRES FIELD DRILLING THE 7/16" HOLES TO FIT THE TRIPOD U-BOLT AT (A) THE TRIPOD -TO-TRIPOD BARS (B) SERVE TO ELIMINATE POSSIBILITY OF PIVOTING AT POINTS LABELED (C). THE THIRD SHORT BAR (D) WILL ELIMINATE PIVOTING AT POINTS LABELED (E). **ALL THREE BARS MUST BE INSTALLED FOR PROPER SAFETY.**


PULL AWAY
NURSE TANK LOCATION
PULL AWAY
VAPOR
LIQUID
LIQUID
VIEW OF BAR (D) FROM THE END
FIELD DRILLED
VIEW A-A
TYPE 5 RISER
B
C
A
FIELD DRILLED 7/16" HOLES
E
D
VIEW B-B
FIELD DRILLED 7/16" HOLES
Q
SMALL SUPPLIED U-BOLT
FIELD CUT
VIEW B-B
VAPOR
ALWAYS PLACE U-BOLT IN THE U-BOLT GROOVE
LIQUID
LIQUID
VIEW A-A
PULL AWAY
NURSE TANK LOCATION
PULL AWAY
SURE1

THE THIRD BAR Ⓓ IS ATTACHED TO THE RISER PIPE AND ONE OF THE TRIPOD-TO-TRIPOD BARS AS SHOWN IN VIEW B-B ON THE RISER DRAWING. THIS BAR REQUIRES A FIELD CUT AT Ⓟ AND TWO 7/16" HOLES DRILLED THRU THE BAR IN THE LONG DIRECTION. THE SMALL SUPPLIED U-BOLT IS USED AS SHOWN TO CONNECT THE CROSS Ⓑ BAR TO THE Ⓓ BAR.

CAUTION: DO NOT DRILL LONGWAYS THRU THE Ⓑ BAR. THE HOLE WILL WEAKEN THE BAR.

3. - PLACE THE LIQUID AND VAPOR TRIPODS IN SERVICE BY CONTINUING FROM STEP 8 ON PAGE 6 UNDER "RECONNECTION AFTER A PULL-AWAY".

TYPE 5 RISER - (REFER TO TYPE 5 RISER DRAWING)

A TYPE 5 RISER IS IDENTICAL TO A TYPE 4 RISER EXCEPT THE QUAD SECTION OF THE RISER IS ORIENTED DIFFERENTLY TO THE NURSE TANKS.

1. - INSTALL THE TWO VAPOR TRIPODS AS SHOWN IN THE TYPE 5 RISER DRAWING.

NOTE: EACH TRIPOD IS ALWAYS SUPPLIED WITH A U-BOLT THAT CLOSELY FITS THE U-BOLT GROOVE ON THE TRIPOD AND A PRE-DRILLED BAR FOR THAT U-BOLT SPACING.

CAUTION: THE SAFETY BARS MUST BE INSTALLED TO LIMIT POSSIBLE PIVOTING AT POINT Ⓙ IN THE PIPING ASSEMBLY.

WHEN MARKING THE BARS FOR THE 7/16" HOLES, KEEP THE SPACE Ⓜ BETWEEN THE RISER PIPE AND THE BOLTS Ⓝ TO LESS THAN 1/8".

2. - INSTALL THE LIQUID SIDE TRIPODS AND SUPPORT BARS AS SHOWN IN THE TYPE 5 RISER DRAWING.

WARNING: IF THE BRACKET BAR SUPPLIED WILL NOT REACH FROM THE TRIPOD TO THE RISER PIPE THAT MEANS THE PIPE OR COUPLINGS AT Ⓙ ARE TOO LONG. SHORTEN THE PIPE OR COUPLINGS SO THAT THE BAR SUPPLIED CAN BE INSTALLED.

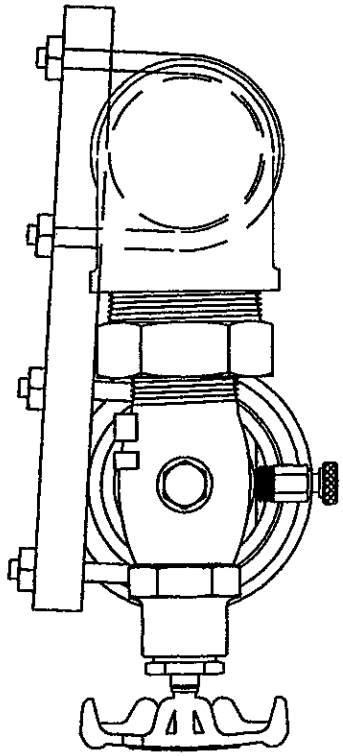
SINCE A BAR AND BOLTS ARE SUPPLIED WITH EACH TRIPOD, THIS INSTALLATION WILL HAVE ONE BAR AND SEVERAL U-BOLTS AND BOLTS LEFT OVER.

THIS INSTALLATION REQUIRES FIELD DRILLING THE 7/16" HOLES TO FIT THE TRIPOD U-BOLT AT Ⓐ THE TRIPOD -TO-TRIPOD BARS Ⓑ SERVE TO ELIMINATE POSSIBILITY OF PIVOTING AT POINTS LABELED Ⓒ. THE THIRD SHORT BAR Ⓓ WILL ELIMINATE PIVOTING AT POINTS LABELED Ⓔ. ALL THREE BARS MUST BE INSTALLED FOR PROPER SAFETY.

THE THIRD BAR Ⓓ IS ATTACHED TO THE RISER PIPE AND ONE OF THE TRIPOD-TO-TRIPOD BARS AS SHOWN IN VIEW B-B ON THE RISER DRAWING. THIS BAR REQUIRES A FIELD CUT AT Ⓟ AND TWO 7/16" HOLES DRILLED THRU THE BAR IN THE LONG DIRECTION. THE SMALL SUPPLIED U-BOLT IS USED AS SHOWN TO CONNECT THE CROSS Ⓑ BAR TO THE Ⓓ BAR.

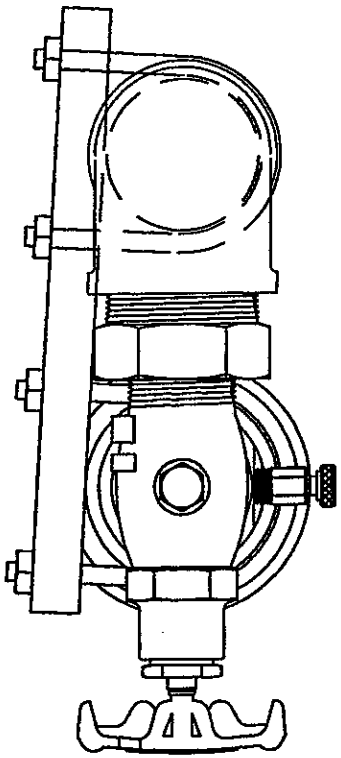
CAUTION: DO NOT DRILL LONGWAYS THRU THE Ⓑ BAR. THE HOLE WILL WEAKEN THE BAR.

3. - PLACE THE LIQUID AND VAPOR TRIPODS IN SERVICE BY CONTINUING FROM STEP 8 ON PAGE 6 UNDER "RECONNECTION AFTER A PULL-AWAY".



VAPOR

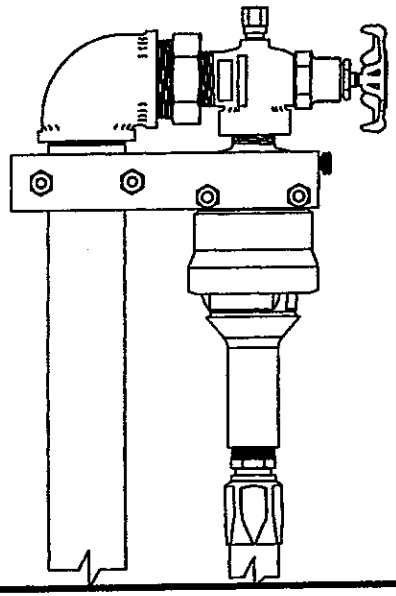
TYPE 1 RISER



LIQUID

VIEW

17

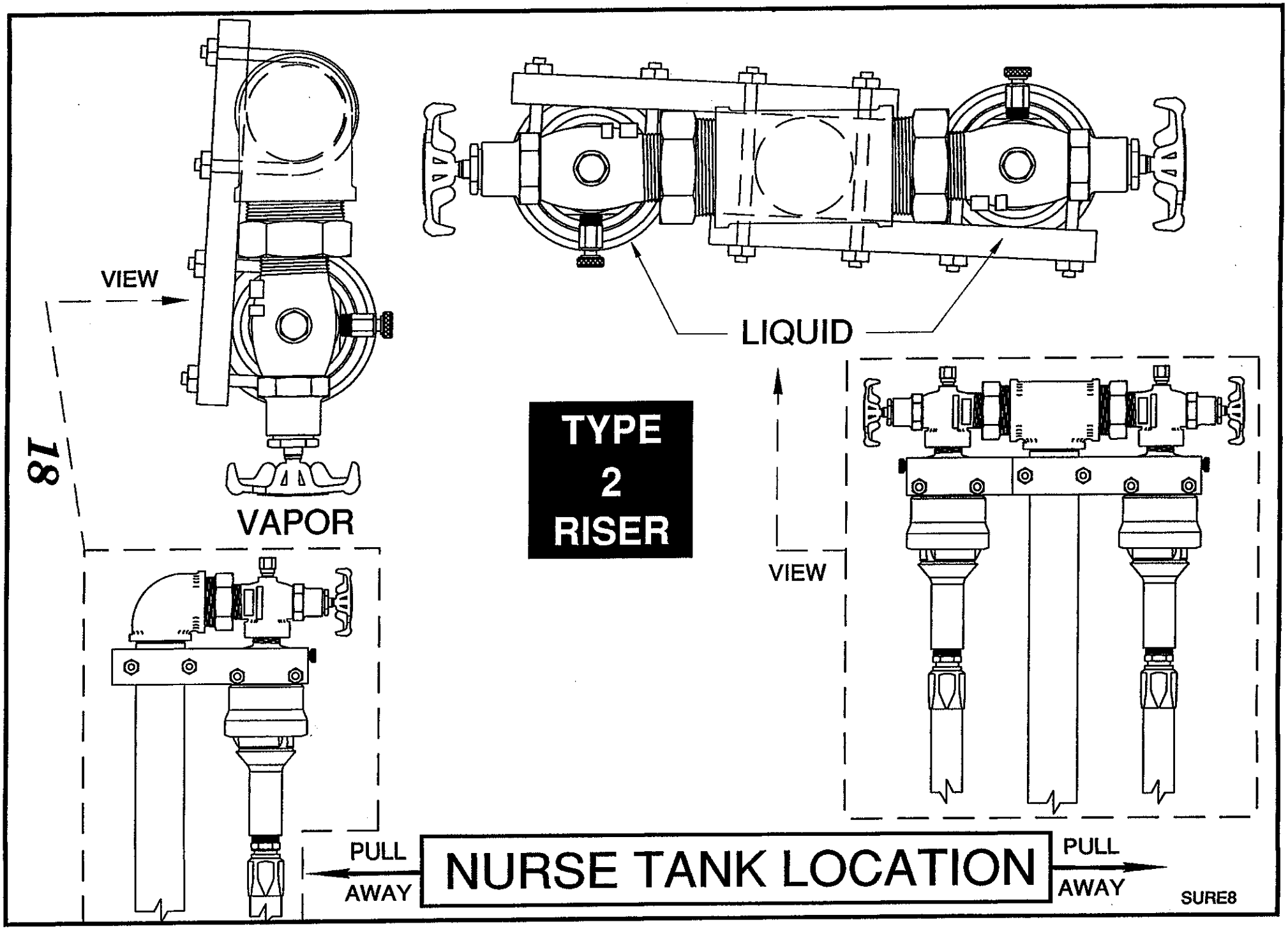


PULL AWAY

NURSE TANK LOCATION

PULL AWAY

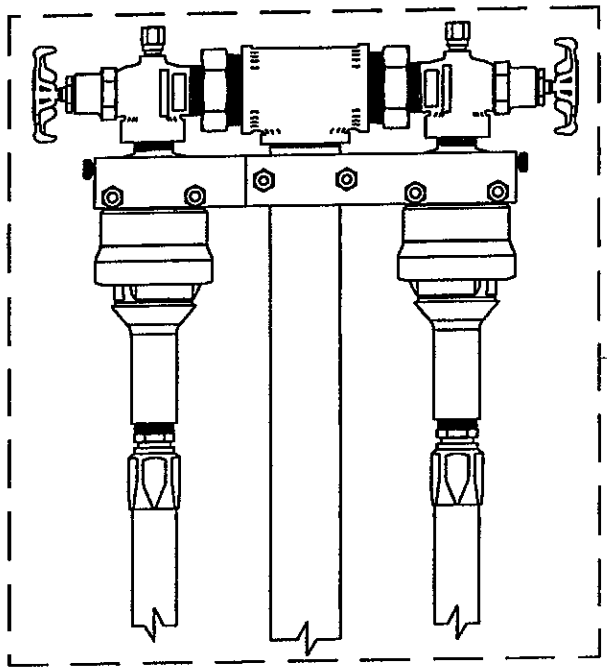
SURE9


VIEW
VAPOR
LIQUID
TYPE
2
RISER
VIEW
18
PULL
AWAY
NURSE TANK LOCATION
PULL
AWAY
SURE8

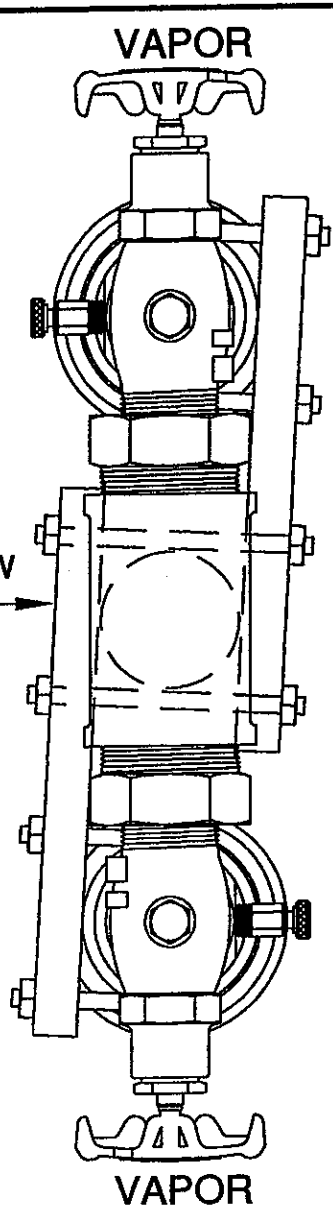
PULL AWAY

NURSE TANK LOCATION

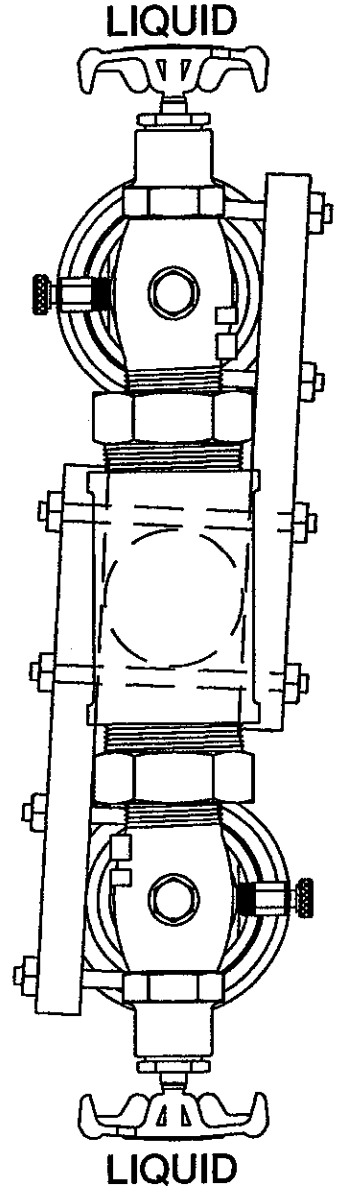
PULL AWAY



VIEW



TYPE 3 RISER



PULL AWAY

NURSE TANK LOCATION

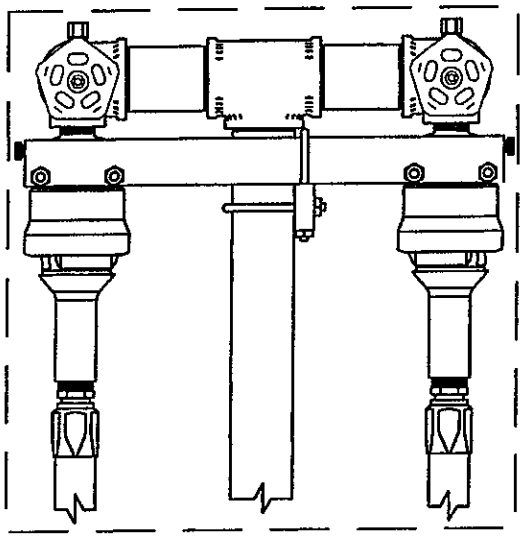
PULL AWAY

SURE7

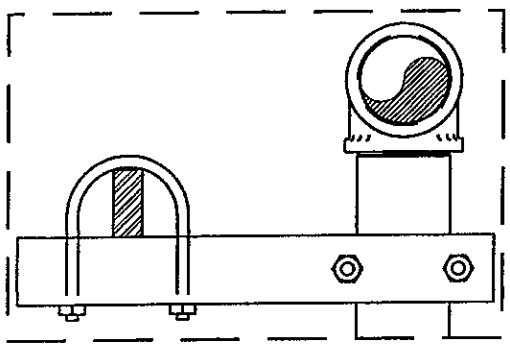
PULL AWAY

NURSE TANK LOCATION

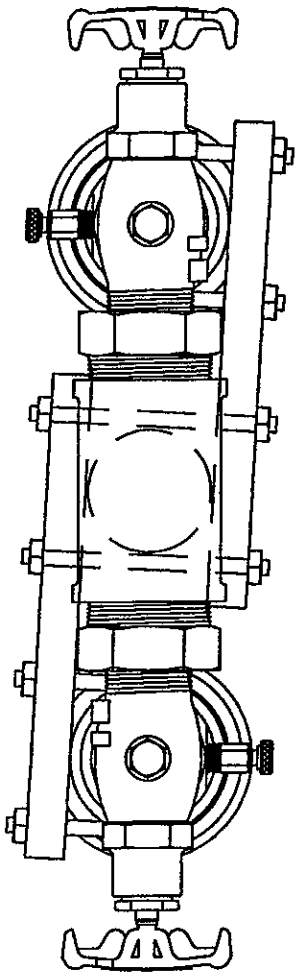
PULL AWAY



VIEW A-A



VIEW B-B



VAPOR

VAPOR

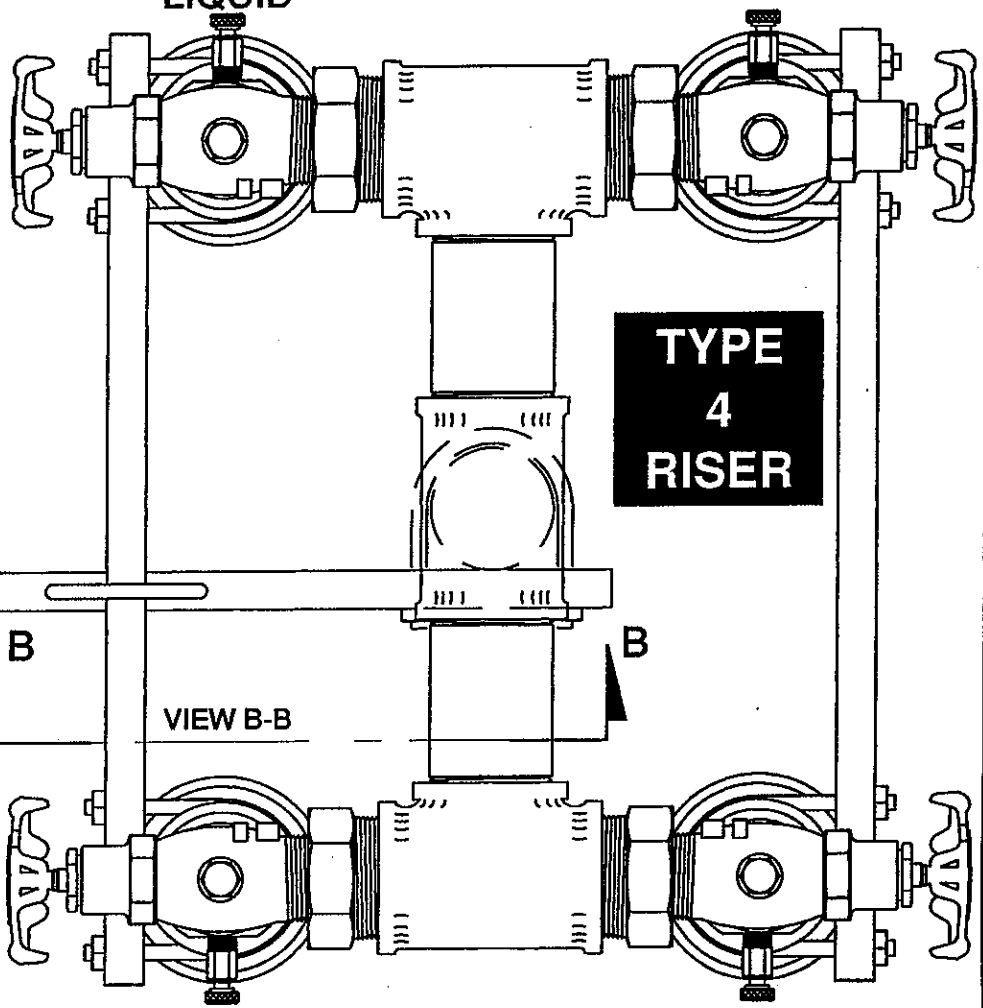
A

A

VIEW A-A

LIQUID

LIQUID



TYPE 4 RISER

B

B

VIEW B-B

LIQUID

LIQUID

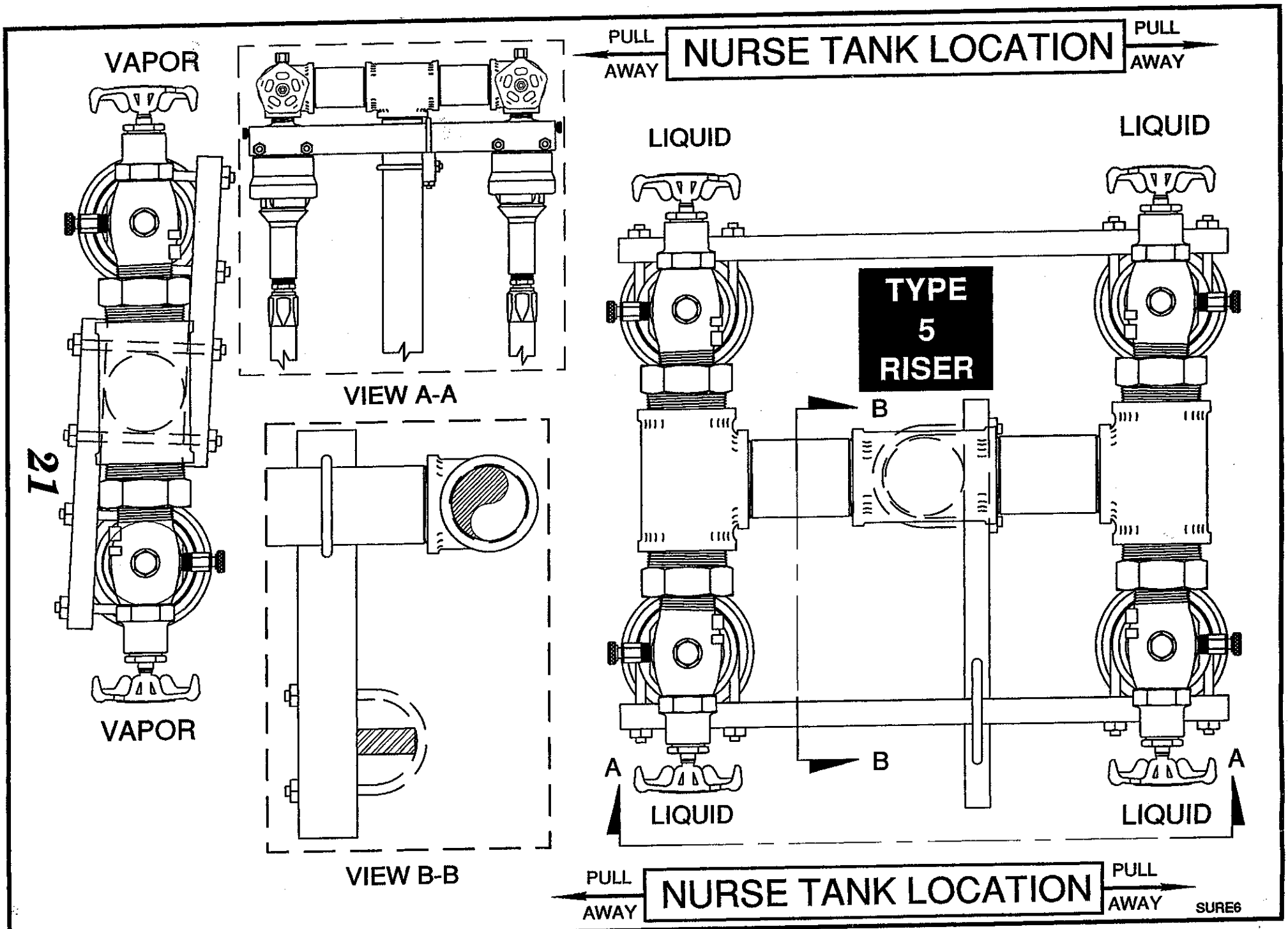
20

PULL AWAY

NURSE TANK LOCATION

PULL AWAY

SURE5


PULL
AWAY
NURSE TANK LOCATION
PULL
AWAY
VAPOR
LIQUID
LIQUID
TYPE
5
RISER
VIEW A-A
B
B
VAPOR
A
A
LIQUID
LIQUID
VIEW B-B
PULL
AWAY
NURSE TANK LOCATION
PULL
AWAY
SURE6