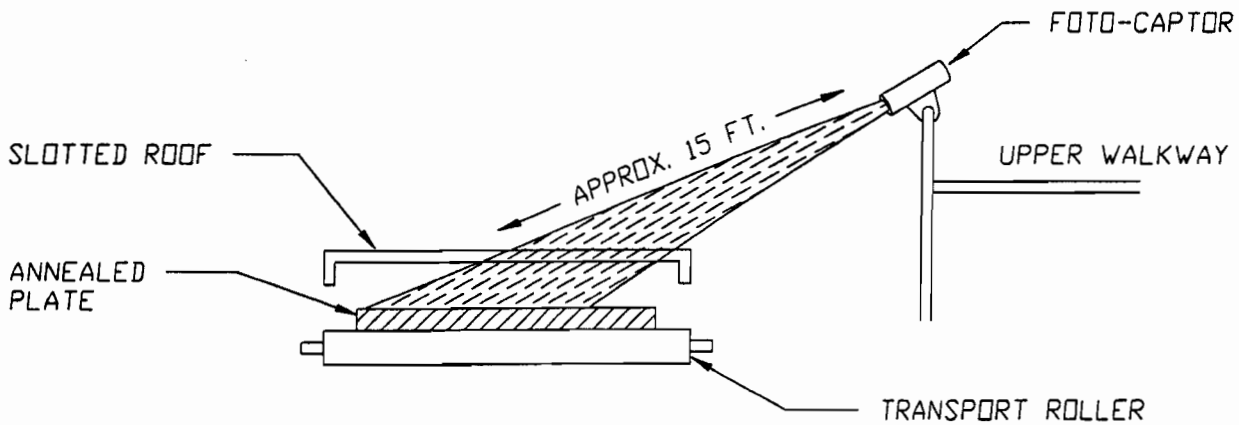
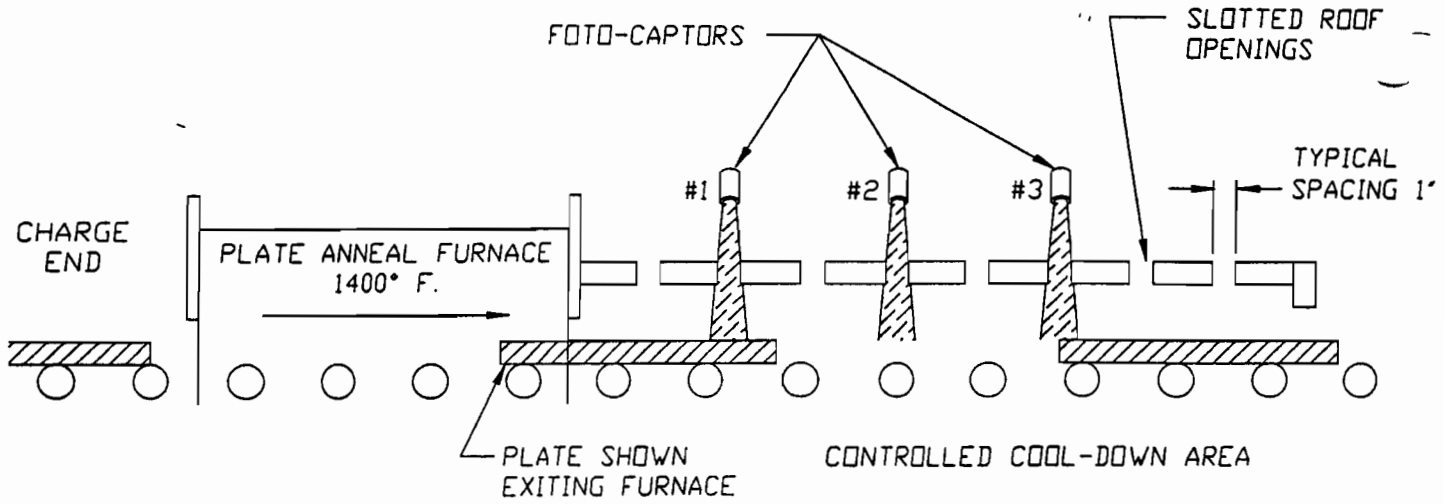


TRACKING THRU ANNEAL FURNACE COOL-DOWN ZONE




END VIEW OF CONTROLLED COOL-DOWN AREA
SHOWING FOTO-CAPTOR MOUNTING POSITIONS.

PROBLEM: PLATE CAN 'HANG UP' AS IT PASSES THRU THE COOL-DOWN AREA. VISUAL CONTACT IS NOT POSSIBLE. THEREFORE, NORMAL PASSAGE CAN NOT BE VERIFIED.

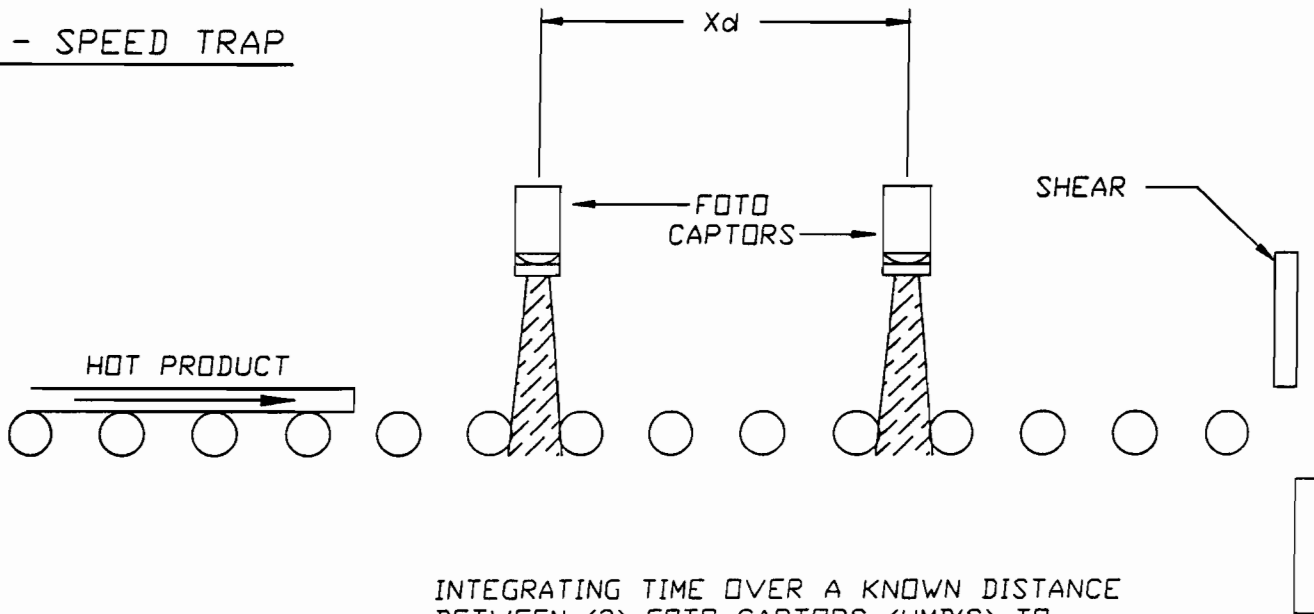
SOLUTION: INSTALL (3) EQUALLY SPACED FOTO-CAPTORS TO VIEW PLATE POSITION THRU NARROW ROOF SLOTS AND DISPLAY VIA POSITION LIGHTS IN MAIN OPERATOR'S PULPIT.

APPLICATION: THE 450° RESPONSE UNIT WAS USED, WHICH WAS ABOVE THE MAXIMUM ROOF PANEL TEMPERATURE BUT RESPONDED TO THE HIGHER TEMPERATURE PLATE.

DRAWN BY: <i>CHIP</i>	DATE: 06/29/90	REV	DESCRIPTION	BY	DATE	TITLE	weber sensors inc. P.O. BOX 203, N. LIMA, OH (216)-549-5746 STATE-OF-THE-ART 
CHECKED BY:						FOTO-CAPTOR TRACKING	
PAGE 1 OF 1	SCALE NONE					THRU ANNEAL FURNACE	
DWG. No.: 003-2						COOL-DOWN ZONE	

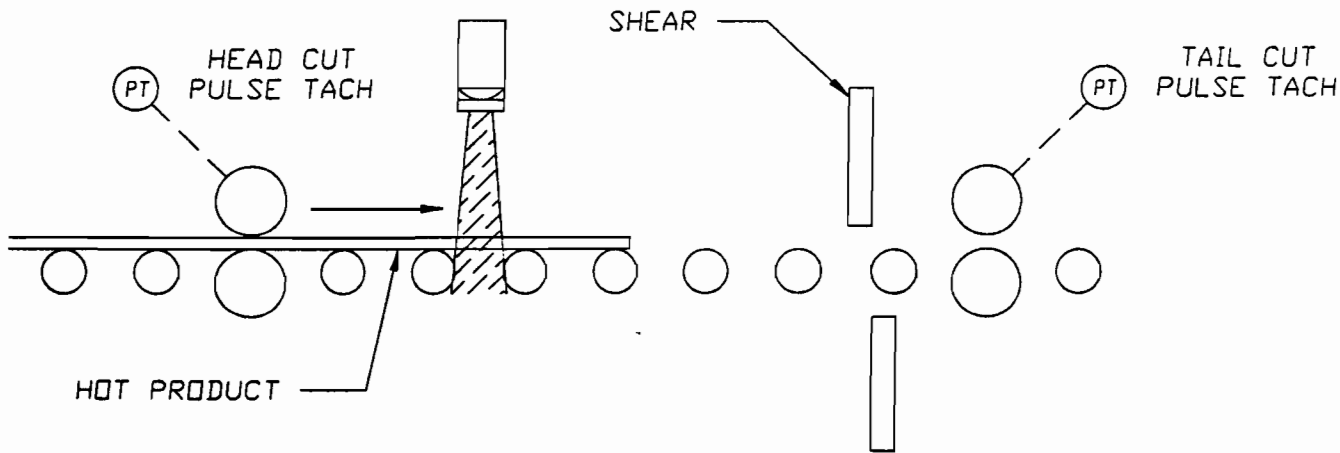
CUT-OFF APPLICATIONS

1 - SPEED TRAP



INTEGRATING TIME OVER A KNOWN DISTANCE
BETWEEN (2) FOTO-CAPTORS (HMD'S) TO
DETERMINE HEAD & TAIL CUT AT SHEAR

2 - PULSE TACH READ



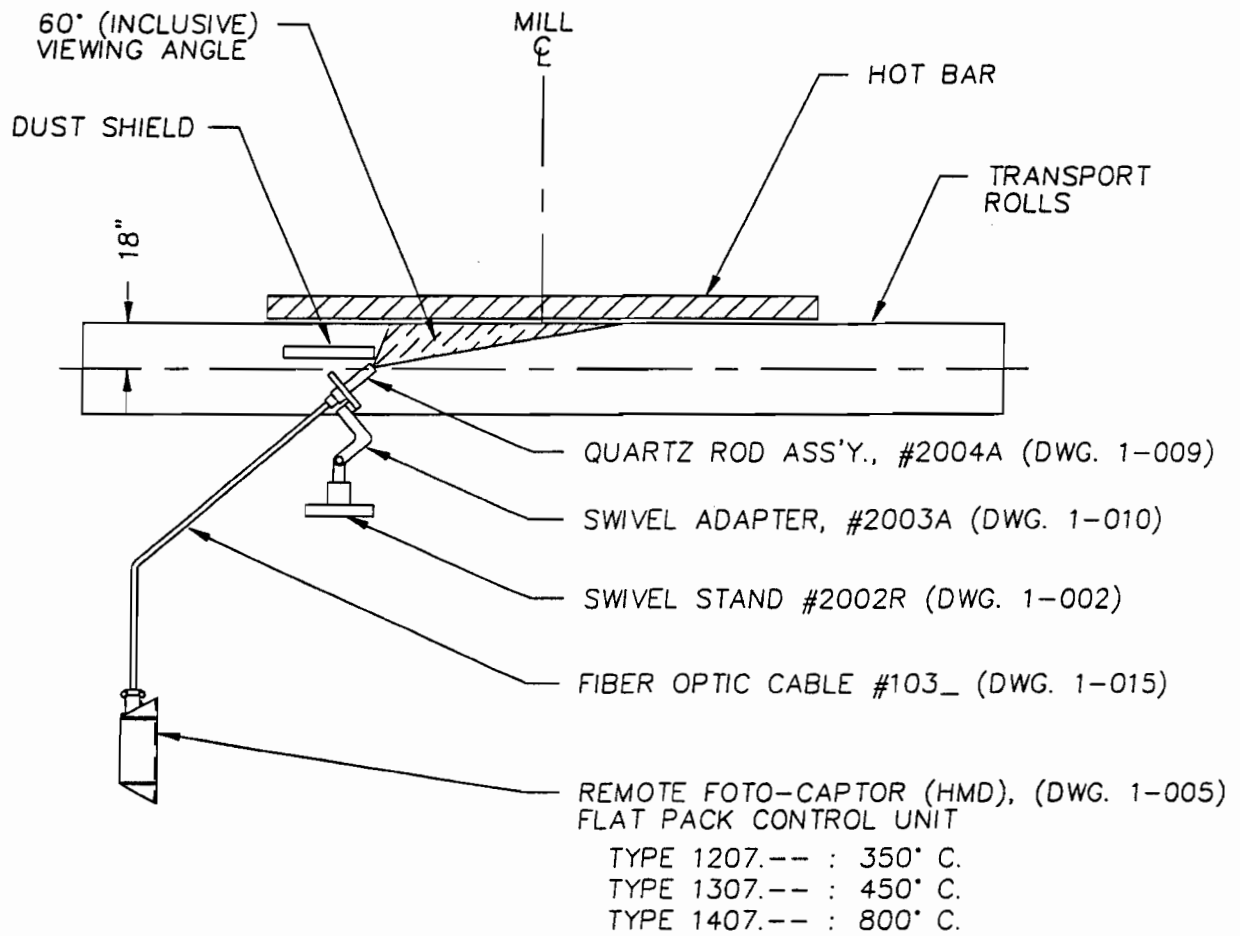
PULSE TACH "READ" INITIATE TO DETERMINE
LEAD AND TAIL CUT AT SHEAR

NOTE: TYPICAL HOT STRIP MILL APPLICATION WOULD USE 450° C. RESPONSE
TEMPERATURE FOTO-CAPTORS WITH A 1° VIEWING FIELD LENS. REDUNDANT
HMD'S AND APPLICATION OF EXTENSION TUBES IS OPTIONAL.


DRAWN BY:	CHIP	DATE	06/26/90	REV	DESCRIPTION	BY	DATE	TITLE
CHECKED BY:								CUT-OFF APPLICATIONS
PAGE 1 OF 1	SCALE	NONE						
DWG. No.:	003-1							

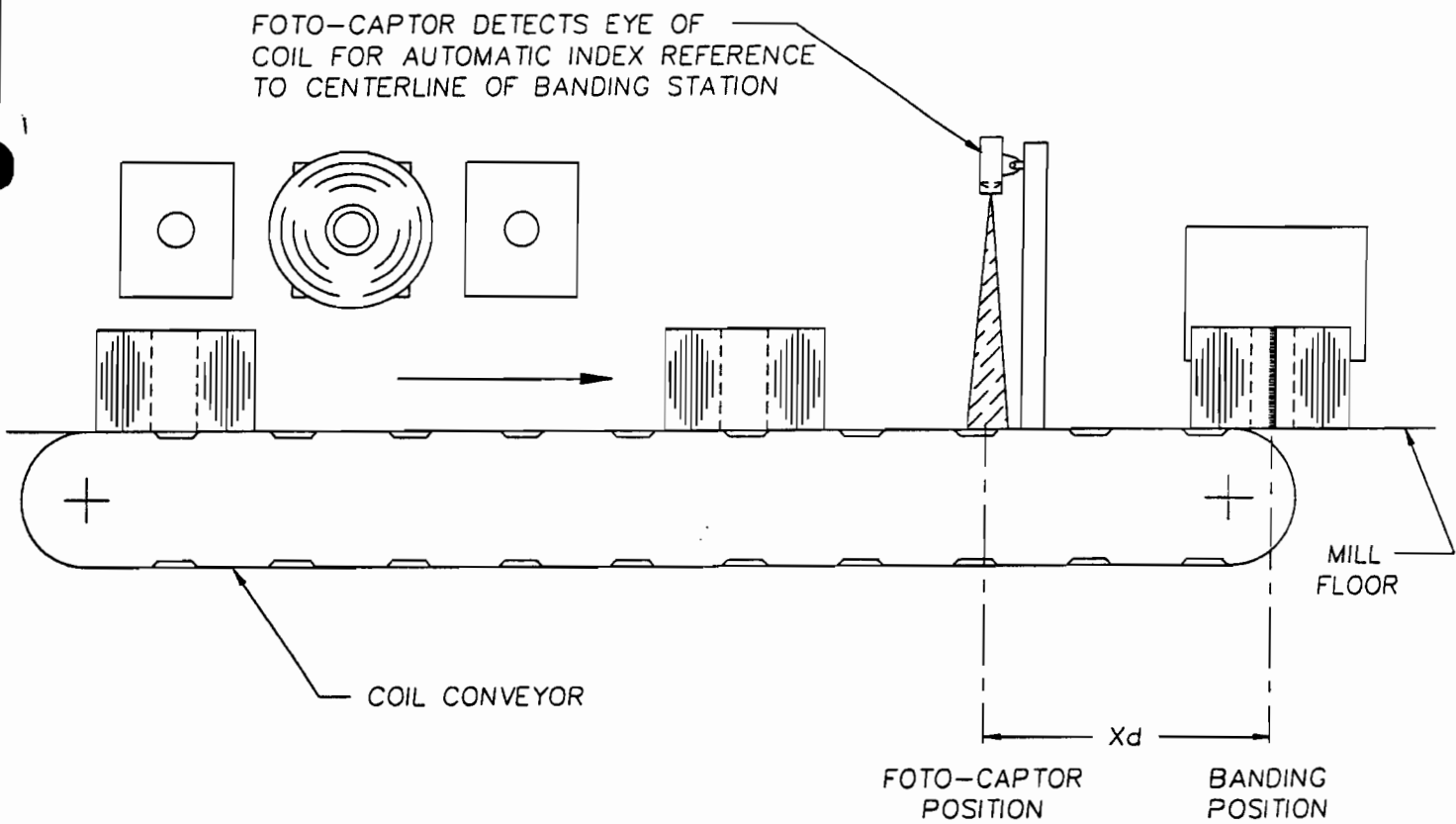
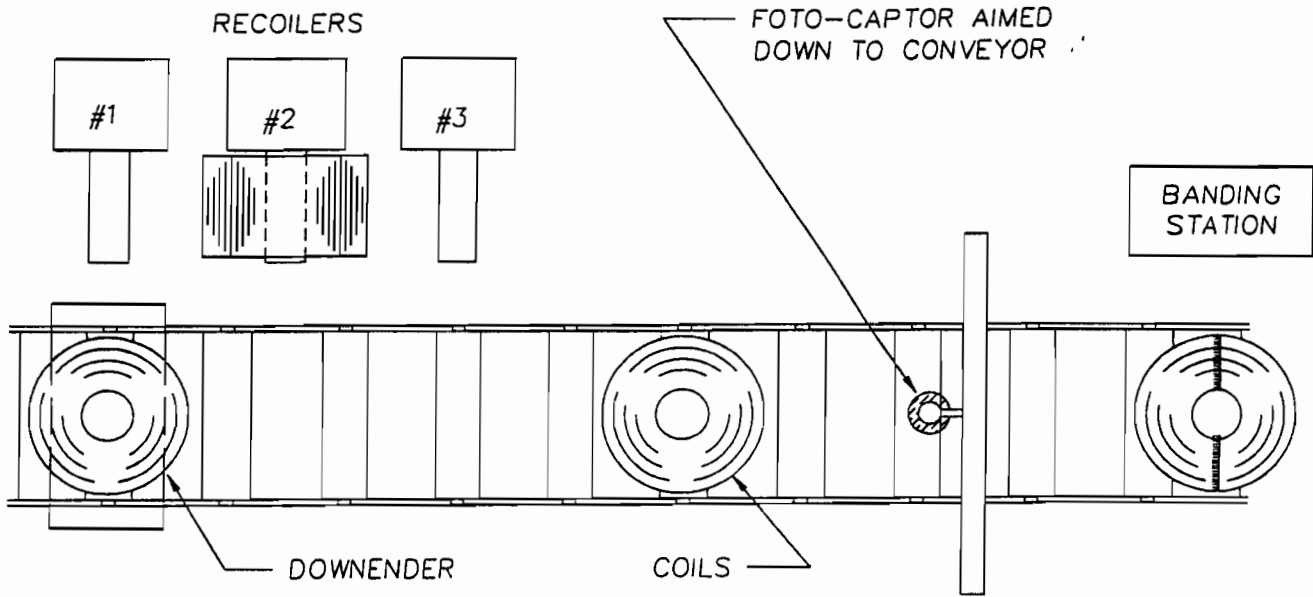
weber sensors inc.
P.O. BOX 203, N. LIMA, OH 44452
(216)-549-5746
STATE-OF-THE-ART






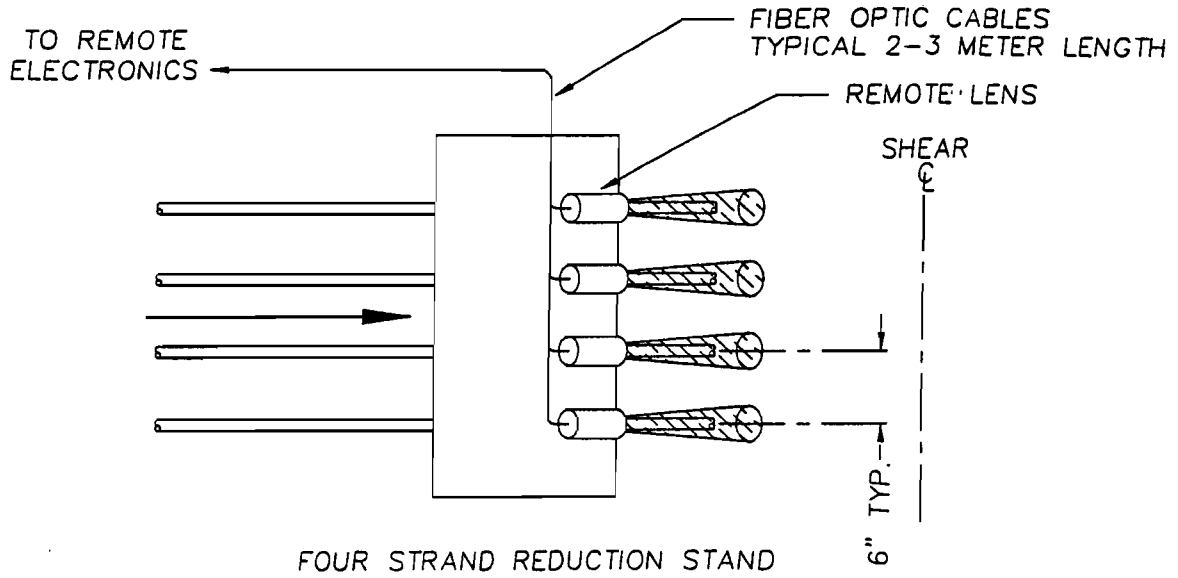
QUARTZ ROD: - VIEWING FIELD ANGLE IS 60° (INCLUSIVE)
 - 18" DISTANCE FROM TARGET = 24"Ø SCAN AREA (FROM CHART #1-007)
 - AMBIENT TEMPERATURE RATING OF QUARTZ ROD IS 450° C.

DRAWN BY: <i>CHIP</i>	DATE 11/21/91	REV	DESCRIPTION	BY	DATE	TITLE	<i>weber sensors inc.</i> P.O. BOX 203, N. LIMA, OH 44452 (216)-549-5746 ENGINEERED SOLUTIONS 
CHECKED BY: G. DIVINCENZO						QUARTZ ROD APPLICATION FOR TRACKING HOT BAR	
PAGE 1 OF 1	SCALE NONE						
DWG. No.:	015						

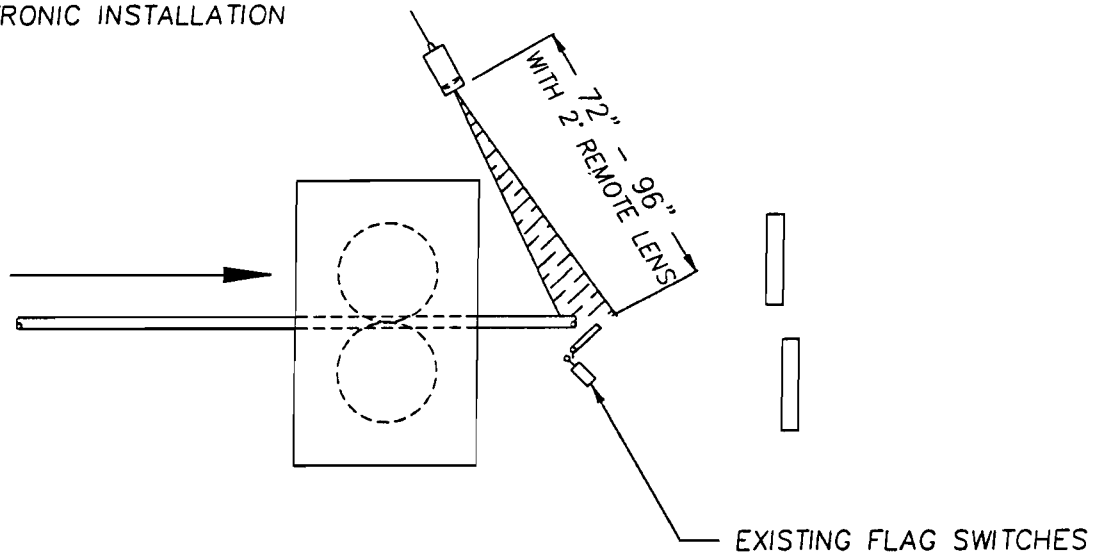


ALL DIMENSIONS IN MM

DESIGNED BY: <i>CHIP</i>	DATE: 10/11/90	REV	DESCRIPTION	BY	DATE	TITLE	<i>weber sensors inc.</i> P.O. 90X 203, N. LIMA, OH 44452 (216)-549-5746 STATE-OF-THE-ART 
CHECKED BY:						COIL BANDER APPLICATION	
PAGE 1 OF 1	SCALE NONE						
DWG. No.: 003-17							




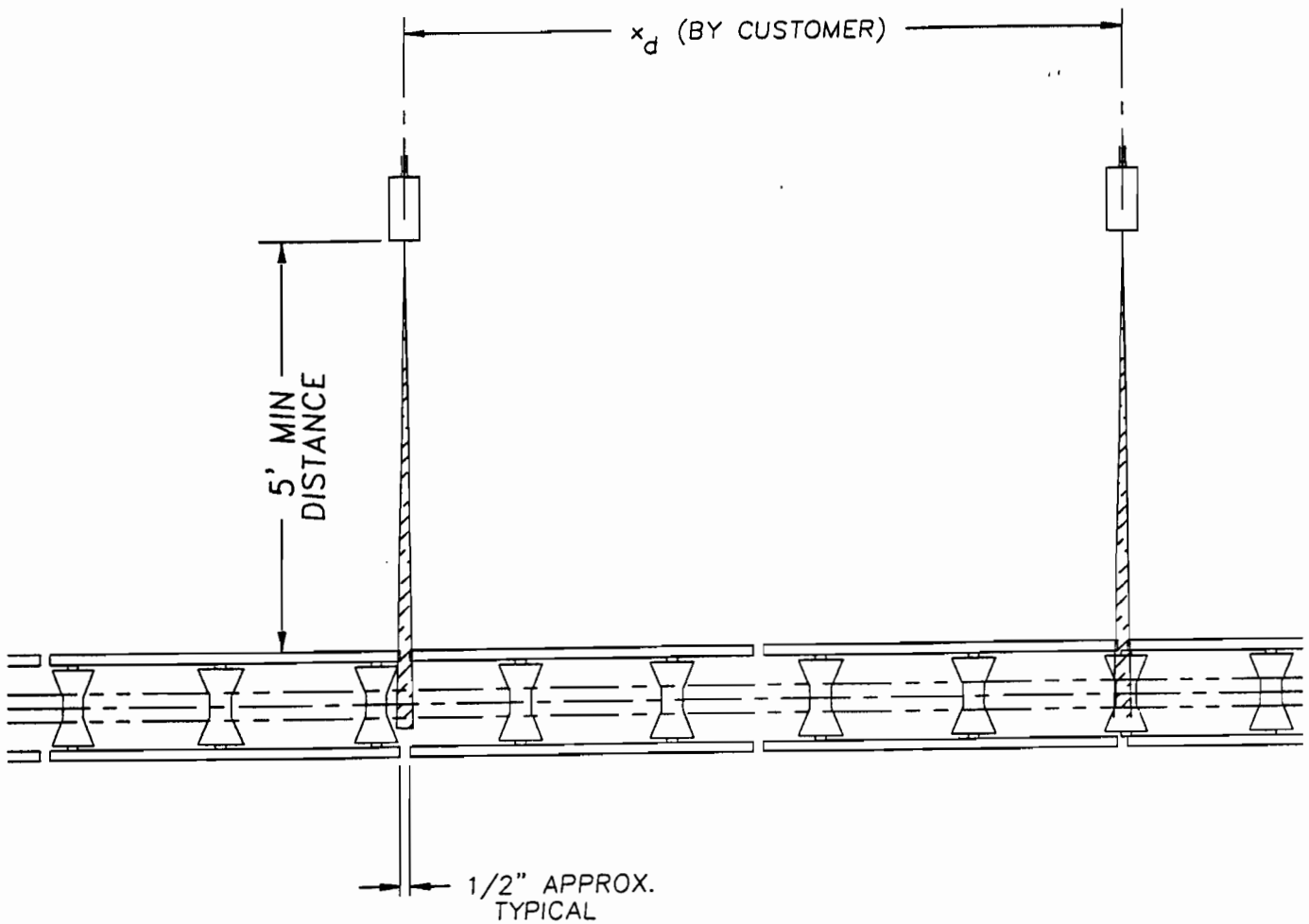
NOTE: SEE DWG. 003-16 FOR TYPICAL
 REMOTE LENS MOUNTING AND
 REMOTE ELECTRONIC INSTALLATION




CROP SHEAR IS CONTROLLED BY (4) REMOTE-TYPE FOTO-CAPTORS (HMD'S)
 WHICH REPLACED THE EXISTING MECHANICAL FLAG SWITCHES.

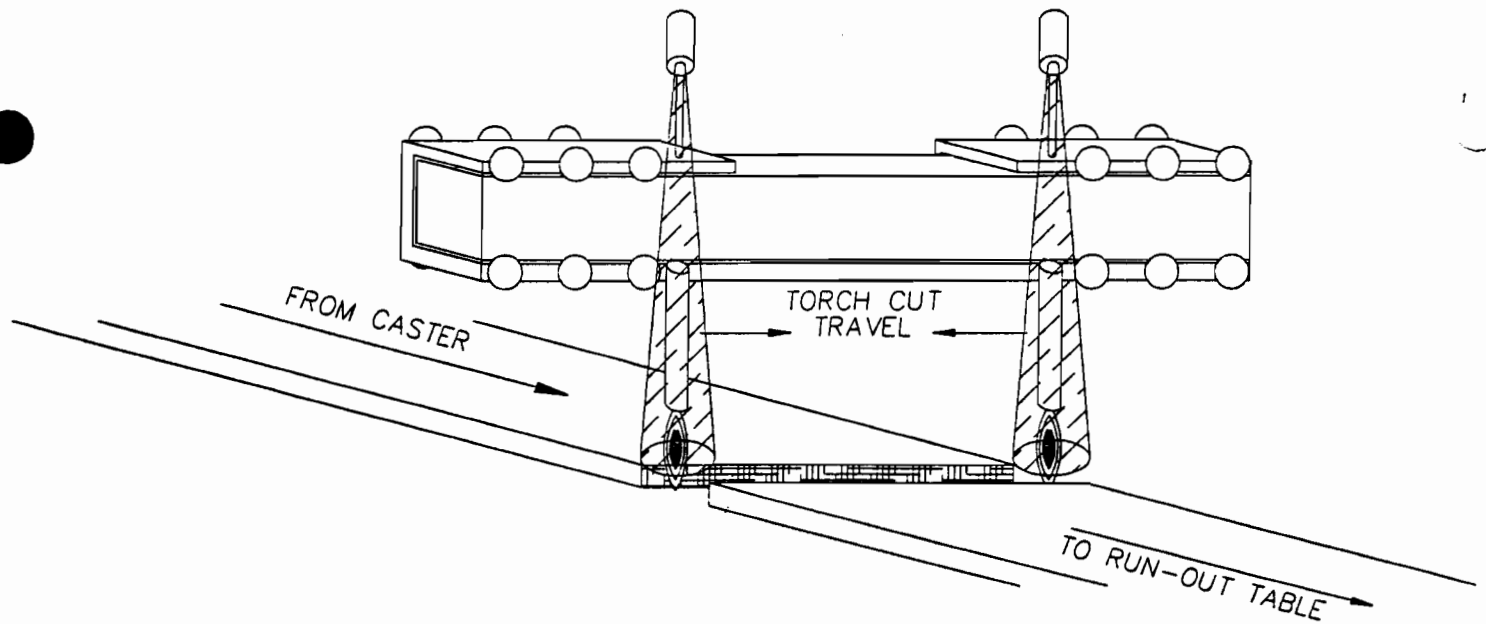
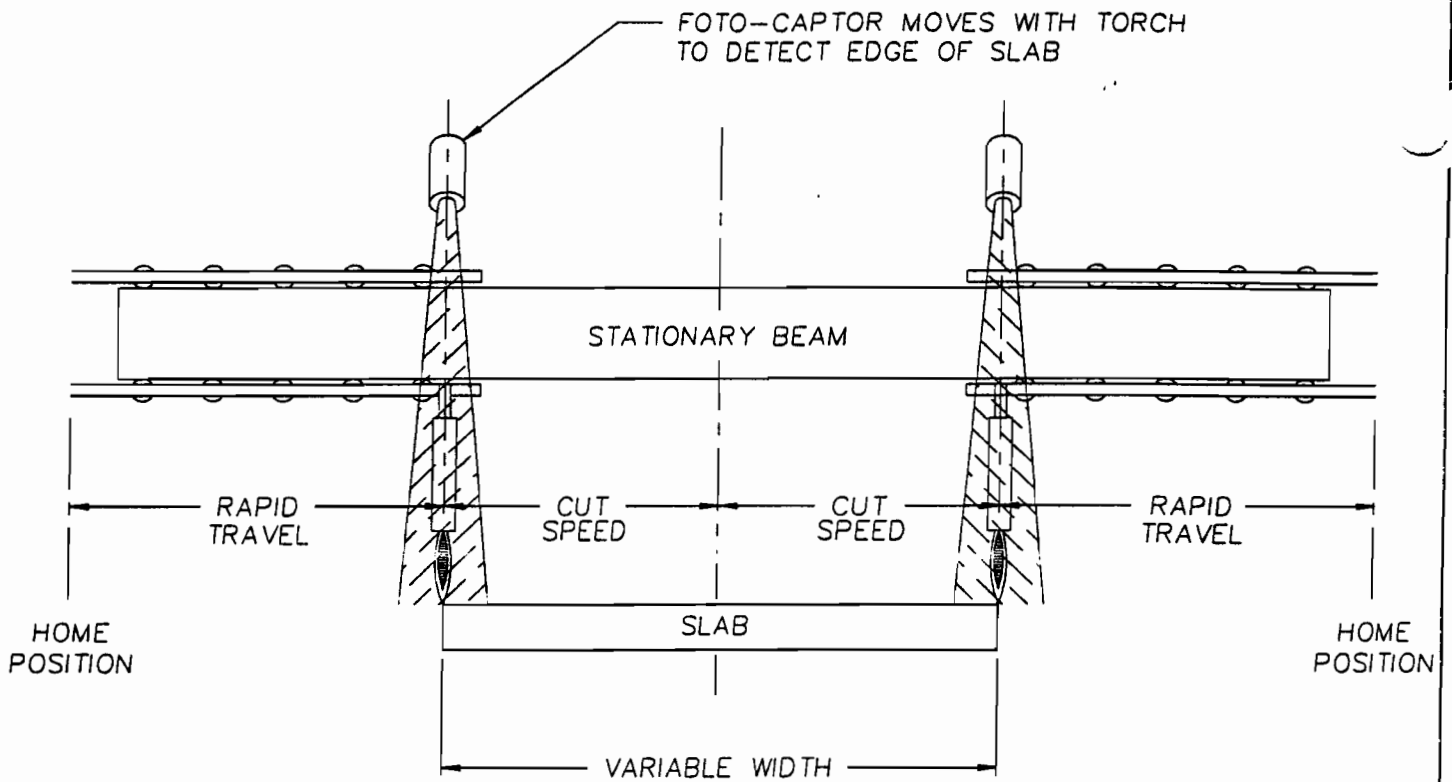
MATERIAL: 1" DIA. MINIMUM STEEL ROD
 TEMPERATURE: 1600° F. MINIMUM
 APPLICATION USES: 450° C. (850° F.) REMOTE TYPE FOTO-CAPTORS WITH
 2" REMOTE LENS AND FIBER OPTIC CABLES.

DRAWN BY: <i>CHIP</i> DATE: 09/04/90		REV	DESCRIPTION	BY	DATE	TITLE	<i>weber sensors inc.</i> P.O. BOX 203, N. LIMA, OH 4441 (216)-549-5746 STATE-OF-THE-ART 
CHECKED BY:						CROP SHEAR CONTROL	
PAGE 1 OF 1	SCALE NONE						
DWG. No.: 003-15							



FRONT VIEW

DRAWN BY: <i>CHIP</i> CHECKED BY:	DATE: 03/30/92	REV:	DESCRIPTION:	BY:	DATE:	TITLE:	<i>weber sensors inc.</i> P.O. BOX 203, N. LIMA, OH 44452 (216)-549-5746 ENGINEERED SOLUTIONS
PAGE 1 OF 1 DWG. No.: 003-19	SCALE: NONE					FOTO-CAPTOR BAR TRACKING APPLICATION THRU SLOT	

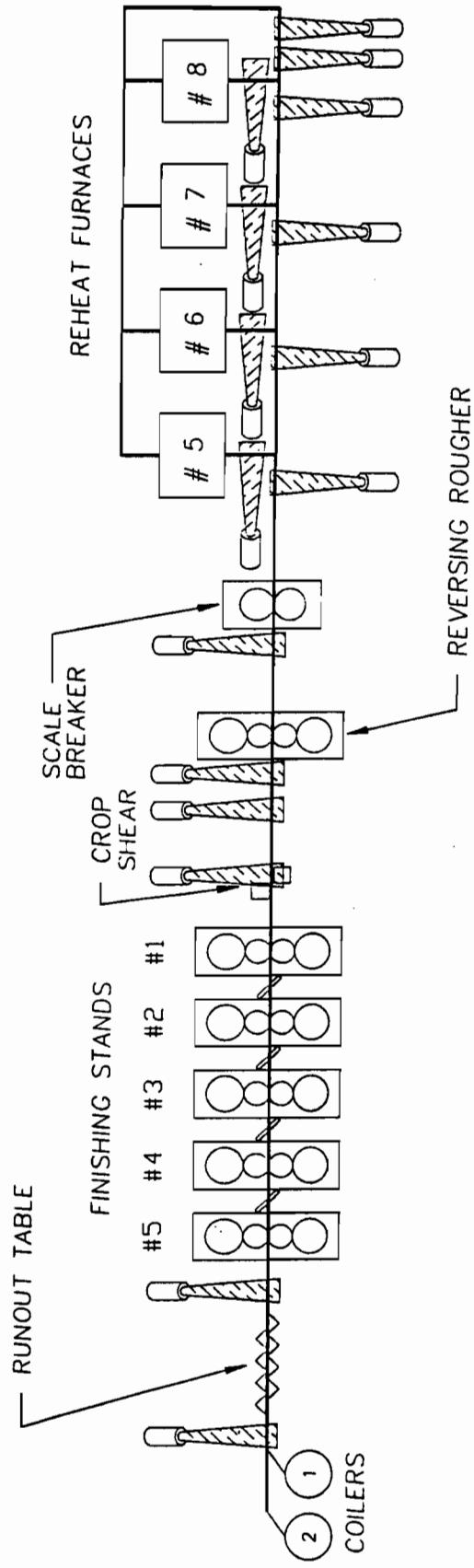


TORCHES HAVE RADID TRAVEL TO WITHIN 1" OF THE SLAB, WHICH IS DETECTED BY THE FOTO-CAPTORS AND CAUSES TORCHES TO SLOW TO "CUT" SPEED

DRAWN BY:	DATE	REV	DESCRIPTION	BY	DATE	TITLE
CHIP	10/15/90					AUTOMATIC SLAB EDGE DETECTION
CHECKED BY:						
PAGE 1 OF 1	SCALE NONE					
DWG. No.:	003-18					

weber sensors inc.
P.O. BOX 203, N. LIMA, OH 4
(216)-549-5746
STATE-OF-THE-ART






TYPICAL FOTO-CAPTOR (HMD) LOCATIONS FOR A HOT STRIP MILL TRACKING SYSTEM

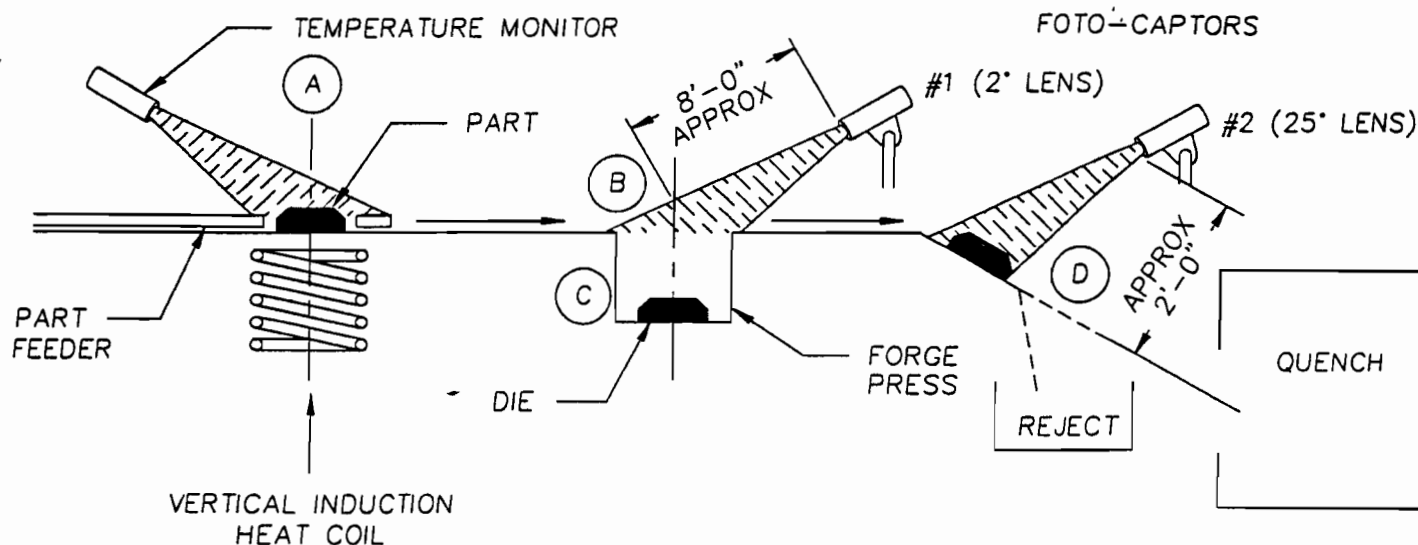
DRAWN BY: <i>CHIP</i>	DATE: 08/03/90
CHECKED BY:	
PAGE 1 OF 1	SCALE NONE
DWG. No.: 003-10	

REV	DESCRIPTION	BY	DATE

TITLE
HOT MILL TRACKING SYSTEM USING FOTO-CAPTORS (HOT METAL DETECTORS)

weber sensors inc.
 P.O. BOX 203, N. LIMA, OH 444
 (216)-549-5746
 STATE-OF-THE-ART





PRODUCT: POWDERED METAL PARTS, 1.5" X 1.5" MINIMUM, IRREGULAR SHAPES

TEMPERATURE: 1600° F. (870° C.)

OPERATION: MONITOR FORGED PARTS TO CONTROL PRESS STROKE

SEQUENCE: PART IS HEATED TO 1600° F. THRU VERTICAL INDUCTION HEAT COILS FEEDER INDEXES PART FROM (A) TO (B) AND RELEASES INTO DIE (C). PART IS FORGED, EJECTED FROM DIE AND INDEXED TOWARD (D) FOR QUENCH OR REJECT.

BY LOGIC, FOTO-CAPTOR #1 SEES PART AT INITIAL (B) POSITION AT RELEASE POINT INTO DIE ONLY AND IGNORES PART DURING DIE EJECTION, ETC., FOTO-CAPTOR #2 CONFIRMS PART IS OUT OF DIE (MUST SEE AT SLOPE).

SELECTION: FOTO-CAPTOR #1: 450° C., 2° LENS
FOTO-CAPTOR #2: 350° C., 25° LENS

REQUIRED POSITION (B): 4" DIA. (PART POSITION IS FIXED)
SCAN AREA: POSITION (D): 12" DIA. (PART POSITION VARIES ±6")
(VIEWING FIELD)

DRAWN BY: *CHIP* DATE: 08/09/90

CHECKED BY:

PAGE 1 OF 1 SCALE NONE

DWG. No.: 003-11

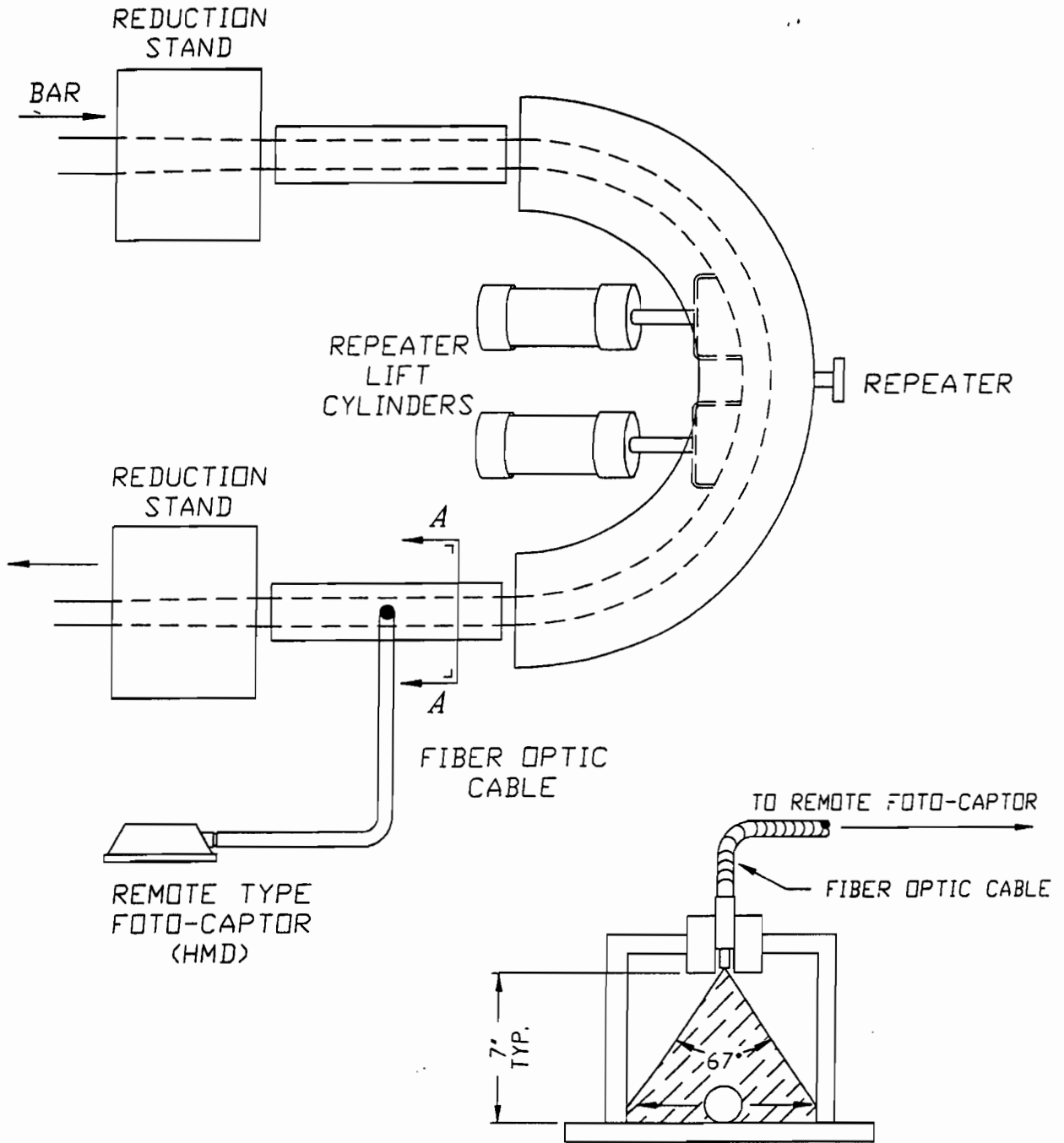
REV	DESCRIPTION	BY	DATE

MONITORING POWDERED METAL FORGING PROCESS

weber sensors inc.
P.O. BOX 203, N. LIMA, OH 44452
(216)-549-5746
STATE-OF-THE-ART



BAR MILL REPEATER AUTOMATIC SEQUENCING



- TYPICAL BAR MILL "REPEATER" APPLICATION USING REMOTE TYPE FOTO-CAPTORS (HMD'S) WITH FIBER OPTIC CABLES. "TAIL" DIRECTION "LOWERS" REPEATER, "HEAD" DIRECTION "RAISES" REPEATER.
- MOST APPLICATIONS WILL USE 350° C. RESPONSE UNITS.

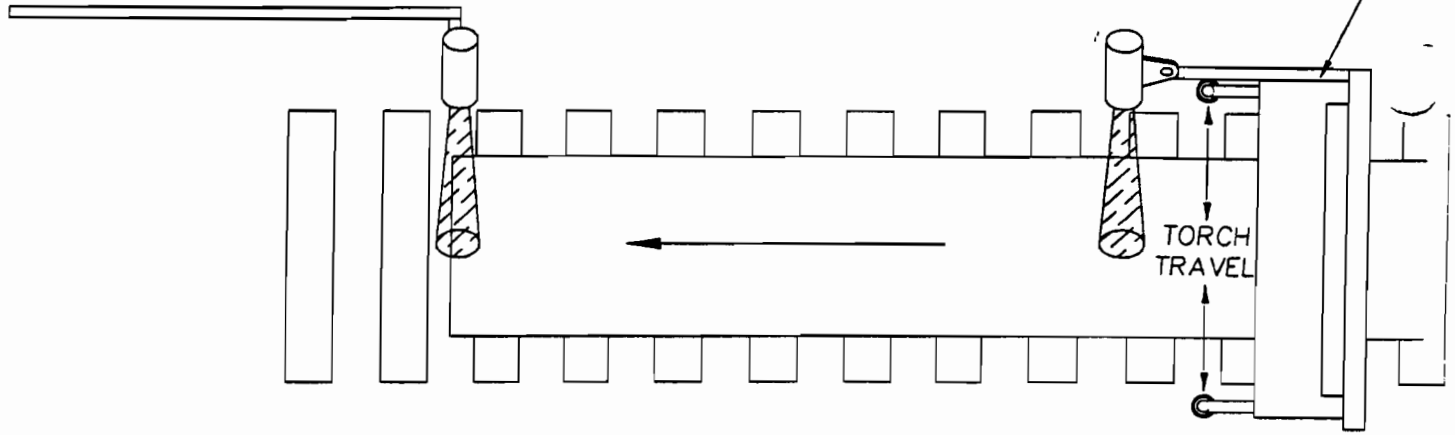
ALL DIMENSIONS IN MM

DRAWN BY: <i>CHIP</i>	DATE: 07/09/90	REV	DESCRIPTION	BY	DATE	TITLE
CHECKED BY:						BAR MILL REPEATER
PAGE 1 OF 1	SCALE NONE					
DWG. No.: <i>003-5</i>						

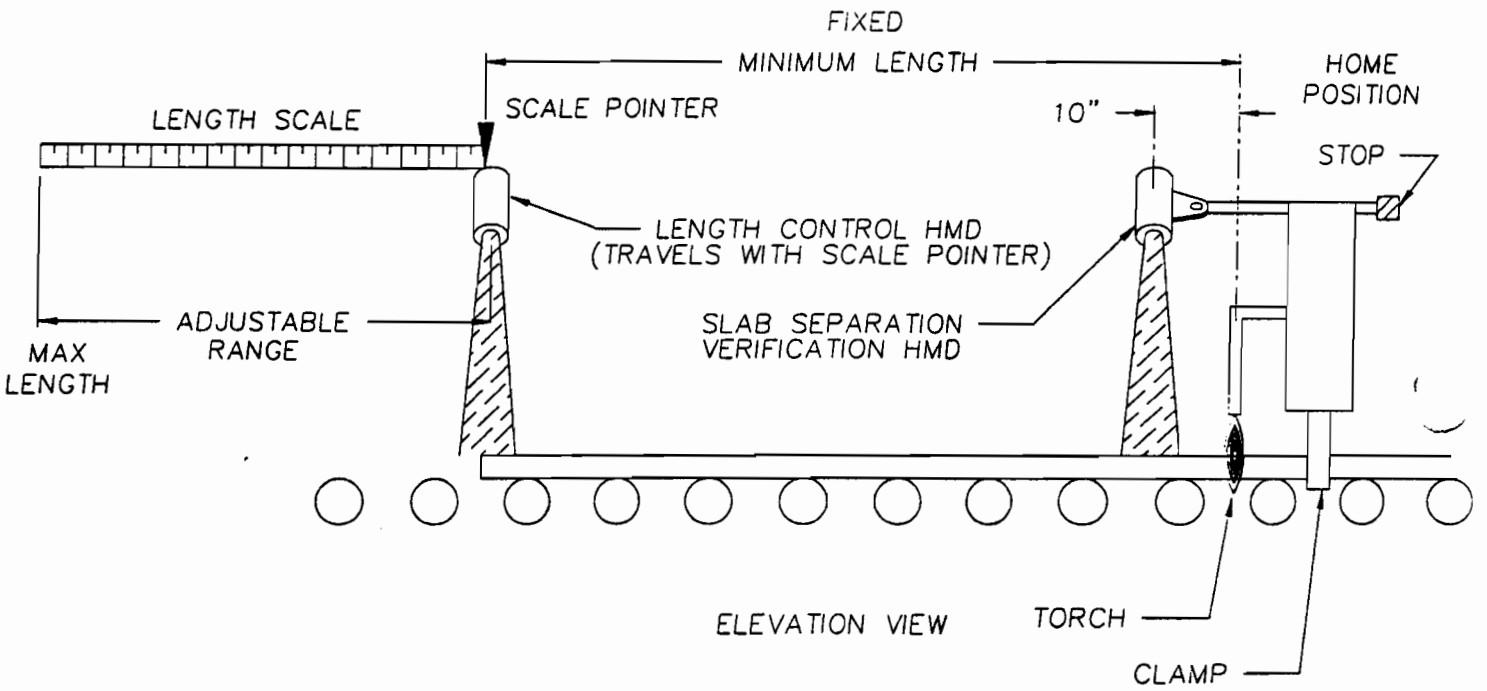
weber sensors inc.
P.O. BOX 203, N. LIMA, OH 44452
(216)-549-5746
STATE-OF-THE-ART



TORCH TRAVEL ASSEMBLY



PLAN VIEW




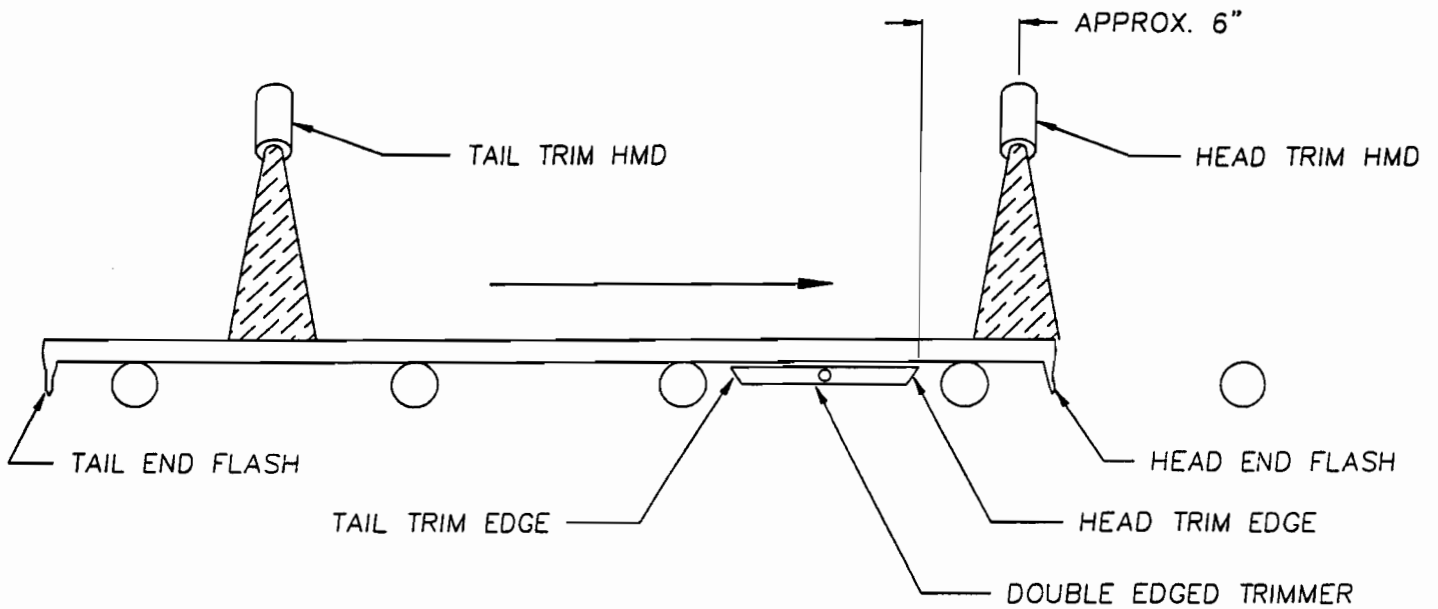
ELEVATION VIEW

SEQUENCE


- 1 - WHEN LEAD END OF SLAB REACHES THE "LENGTH CONTROL" HMD, THE TORCH CLAMP IS INITIATED.
- 2 - AFTER SLAB IS CUT AND MOVES BEYOND THE "SLAB SEPARATION VERIFICATION" HMD, THE CLAMPS DISENGAGE AND THE TORCH MOVES BACK TO HOME POSITION.

ALSO SEE DRAWING 003-7

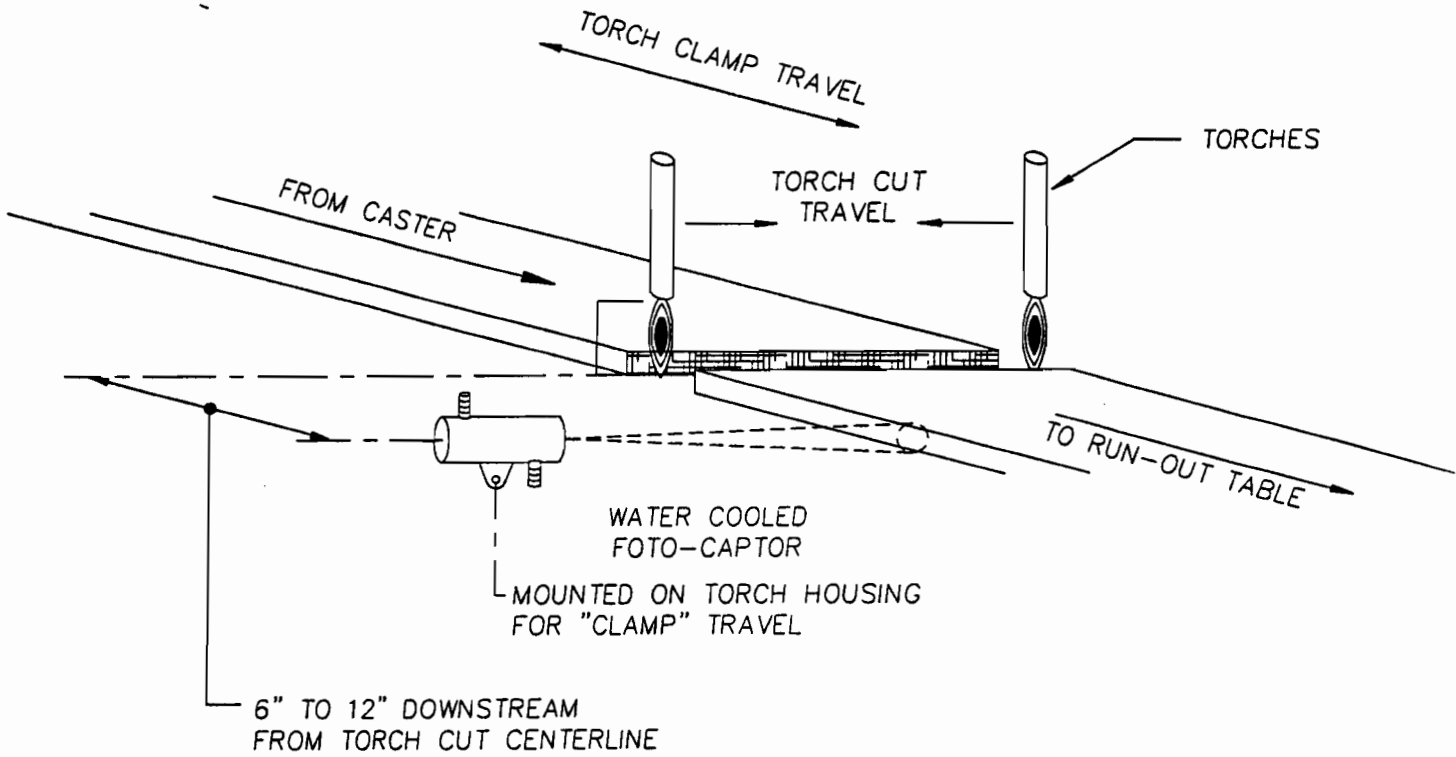
DRAWN BY: <i>CHIP</i>	DATE: 08/24/90	REV	DESCRIPTION	BY	DATE	TITLE	weber sensors inc. P.O. BOX 203, N. LIMA, OH (216)-549-5746 STATE-OF-THE-ART 
CHECKED BY:						SLAB CASTER LENGTH CONTROL	
PAGE 1 OF 1	SCALE NONE						
DWG. No.: 003-13							



- WHEN SLAB IS AT THE HEAD TRIM FOTO-CAPTOR (HMD) THE SLAB DECELERATES TO ZERO SPEED, THE TRIMMER ROTATES SO THE HEAD TRIM EDGE COMES IN CONTACT WITH SLAB AND THE SLAB THEN REVERSES DIRECTION TRIMMING THE FLASH OFF OF THE HEAD END.
- WHEN THE HEAD TRIM FOTO-CAPTOR SENSES THE END OF THE SLAB THE TRIMMER IS RETURNED TO THE NEUTRAL POSITION. THE SLAB THEN BEGINS TO TRAVEL IN ITS ORIGINAL DIRECTION.
- THE TAIL TRIM FOTO-CAPTOR (HMD) SEES THE TAIL END AND ROTATES THE TRIMMER SO THAT THE TAIL TRIM EDGE COMES IN CONTACT WITH THE SLAB AND TRIMS THE TAIL END FLASH FROM THE SLAB. THE SLAB CONTINUES MOVING UNTIL THE HEAD TRIM FOTO-CAPTOR SEES THE TAIL END AND ROTATES THE TRIMMER BACK TO ITS NEUTRAL POSITION.

DRAWN BY: <i>CHIP</i>		DATE: <i>08/27/90</i>	REV	DESCRIPTION	BY	DATE	TITLE	<i>weber sensors inc.</i> P.O. BOX 203, N. LIMA, OH 44452 (216)-549-5746 STATE-OF-THE-ART 
CHECKED BY:							SLAB FLASH TRIMMER	
PAGE 1 OF 1	SCALE	NONE						
DWG. No.:	<i>003-14</i>							

SLAB SEPERATION VERIFICATION




- The FOTO-CAPTOR (HMD) is mounted six to twelve inches "downstream" of the cut-off torch centerline. Slab must seperate by this distance.
- When FOTO-CAPTOR sees tail out of cut slab the torch "cut" sequence is terminated and the torch assembly "unclamps" and returns to its "home" position.

DRAWN BY:	DATE	REV	DESCRIPTION	BY	DATE	TITLE
CHIP	07/24/90					SLAB SEPERATION VERIFICATION FOTO-CAPTOR APPLICATION
CHECKED BY:						
PAGE 1 OF 1	SCALE NONE					
DWG. No.:	003-7					

weber sensors inc.
 P.O. BOX 203, N. LIMA, OH 44452
 (216)-549-5746

STATE-OF-THE-ART



FIBER OPTIC CONNECTION

REMOTE LENS

SWIVEL MOUNT

CUSTOMER'S ANGLE OR CHANNEL

2" R. (MIN)

POWER CABLE

HINGED SIDE

FIBER OPTIC CABLE

REMOTE FOTO-CAPTOR

TERMINAL STRIP (OPPOSITE OF FIBER OPTIC CABLE)

RUBBER INSERT INLET FITTING

TYPICAL REMOTE LENS MOUNTING WITH REMOTE CONTROLLER IN NEMA 12 ENCLOSURE

CAUTION: FIBER OPTIC CABLE COVERING IS CONDUCTIVE. DO NOT ROUTE NEAR EXPOSED TERMINALS.

DRAWN BY: *CHIP* DATE: 09/04/90

REV DESCRIPTION BY DATE TITLE

CHECKED BY:

PAGE 1 OF 1 SCALE NONE

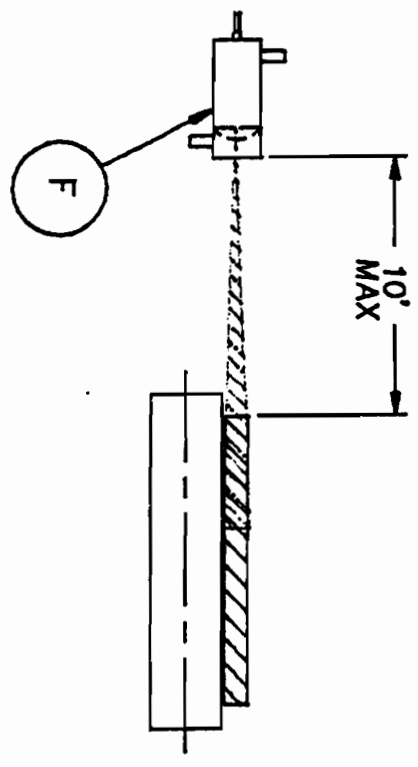
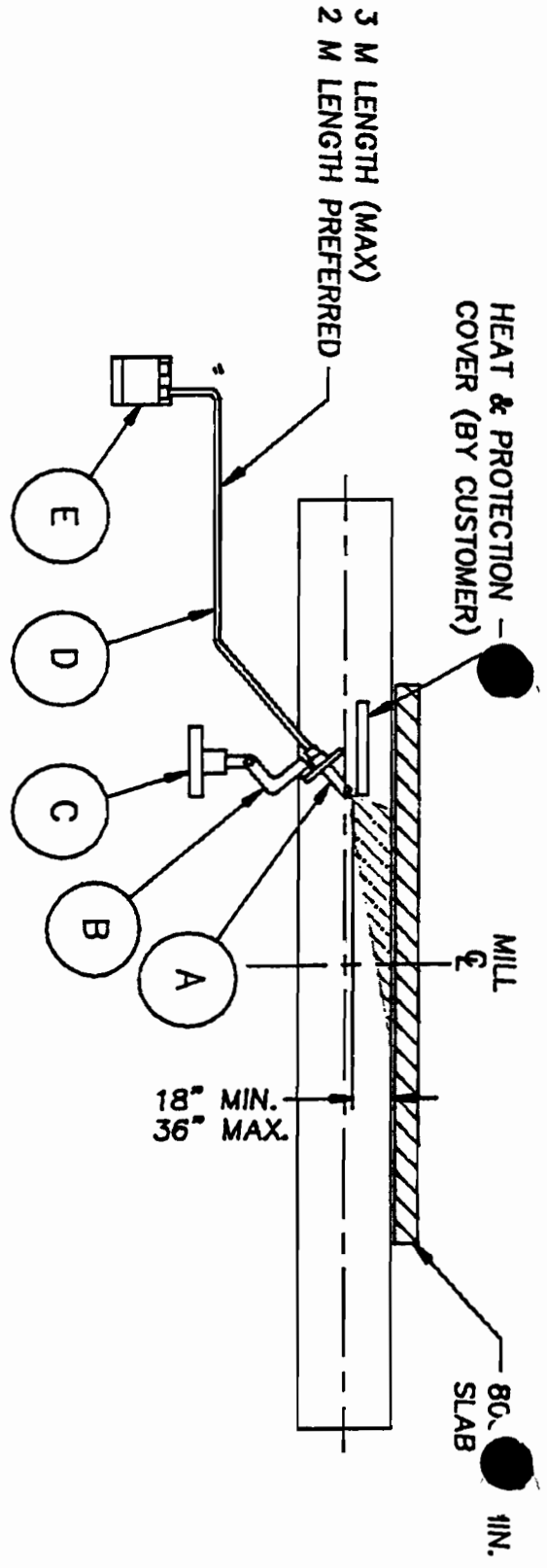
DWG. No.: 003-16

TYPICAL REMOTE LENS INSTALLATION

weber sensors inc.
P.O. BOX 203, N. LIMA, OH 444
(216)-549-5746

STATE-OF-THE-ART





ITEM	DESCRIPTION	DWG No.
A	QUARTZ ROD ASSEMBLY	1-009
B	STAND ADAPTER	1-010
C	SMIVEL STAND	1-002
D	FIBER OPTIC CABLE	1-015
E	TYPE 1207- CAPTOR	1-005
F	TYPE 1222- CAPTOR	1-003
G	TYPE 1221- CAPTOR	1-001

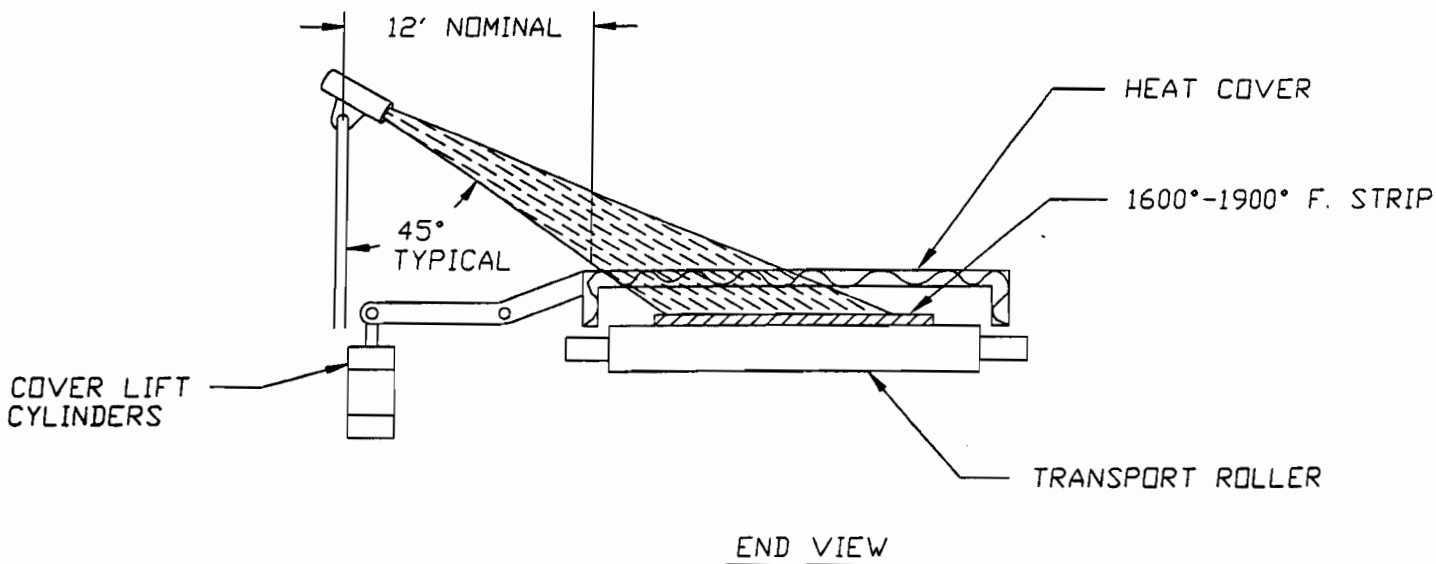
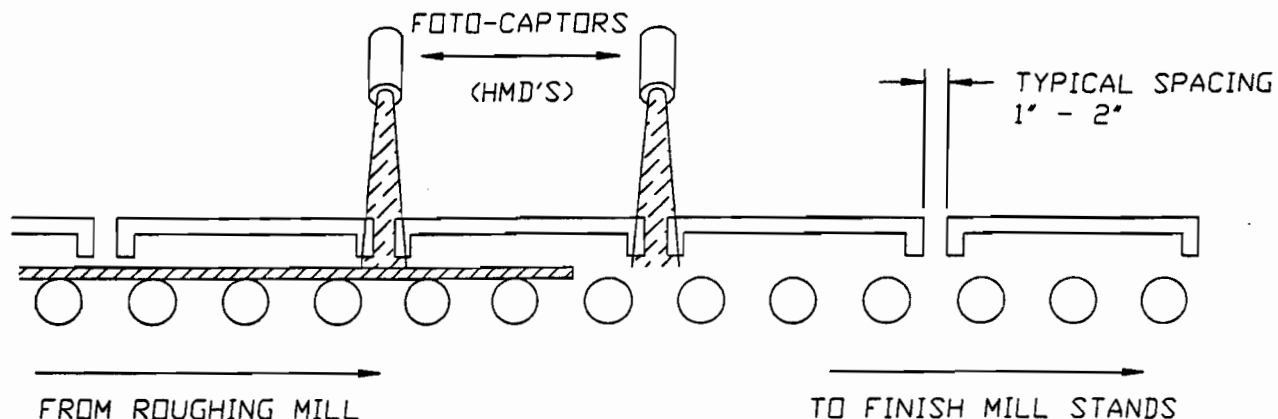
DRAWN BY: *CHIP* DATE: *04/03/92*
 CHECKED BY: _____
 PAGE 1 OF 1 SCALE NONE
 DWG. No.: **003-21**

REV	DESCRIPTION	BY	DATE

TITLE: **FOTO-CAPTOR SLAB DETECTION OPTIONS**

weber sensors Inc.
 P.O. BOX 203, N. LIMA, OH 44452
 (216)-544-5746
 ENGINEERED SOLUTIONS


STRIP TRACKING THRU HEAT COVERS IN A HOT STRIP MILL

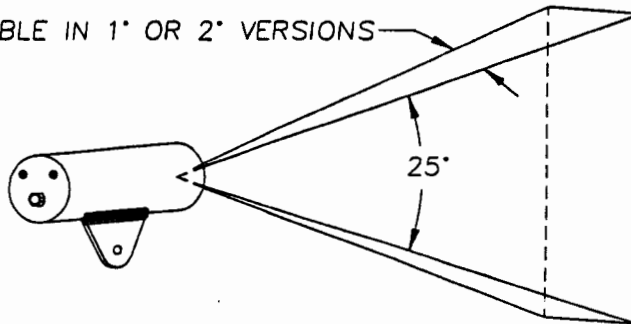


- ABOVE APPLICATION USED 450° C. RESPONSE FOTO-CAPTORS WITH A 2° VIEW FIELD LENS.
- THE ABOVE ANGLE AND MOUNTING DISTANCE PERMITS STRIP DETECTION THRU THE SPACING BETWEEN THE HEAT COVERS WITHOUT FALSE TRIGGERING ON THE COVER SURFACE TEMPERATURE OR FROM VIEWING THE RADIANT HEAT LINING OF THE INSIDE COVER WALLS. NORMAL DETECTION EXISTS WITH COVERS IN 'RAISED' POSITION.
- THE FOTO-CAPTOR ELIMINATES THE REQUIREMENT TO MODIFY THE HEAT COVERS TO ACCEPT OTHER TYPES OF HMD'S.
- THE NOMINAL 12 FT. MOUNTING DISTANCE ELIMINATES THE REQUIREMENT FOR COOLING JACKETS ON THE HMD.

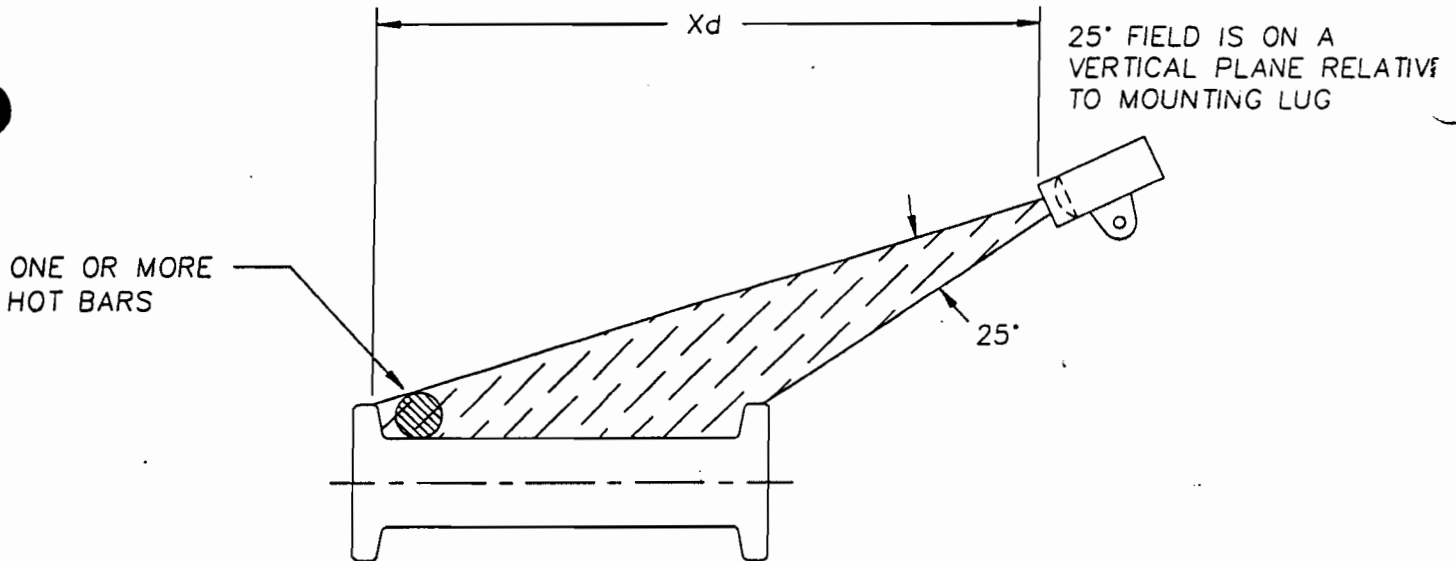
DRAWN BY:	DATE	REV	DESCRIPTION	BY	DATE	TITLE	weber sensors inc. P.O. BOX 203, N. LIMA, OH 44452 (216)-549-5746 STATE-OF-THE-ART
CHECKED BY:	CHIP 07/03/90					STRIP TRACKING	
PAGE 1 OF 1	SCALE NONE					THRU HEAT COVER IN	
DWG. No.:	003-3					A HOT STRIP MILL	

FOTO-CAPTOR VIEWING FIELDS OTHER THAN CIRCULAR

AVAILABLE IN 1° OR 2° VERSIONS



TYPICAL APPLICATION



X_d IS DETERMINED FROM SCAN AREA/DISTANCE CHART, (DRAWING 1-007).
ASSUMING ROLL FACE DIMENSION "X" IS 36", X_d WOULD BE 7 FT.

DRAWN BY:	DATE	REV	DESCRIPTION	BY	DATE	TITLE
CHIP	07/24/90					VIEWING FIELDS OTHER THAN CIRCULAR
CHECKED BY:						
PAGE 1 OF 1	SCALE NONE					
DWG. No.:	003-8					

weber sensors inc.
P.O. BOX 203, N. LIMA, OH 444
(216)-549-5746
STATE-OF-THE-ART



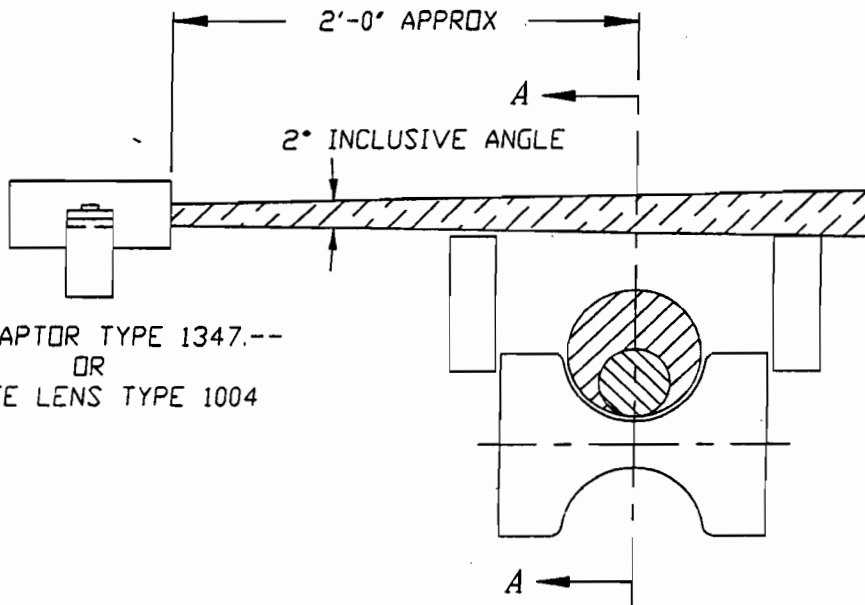
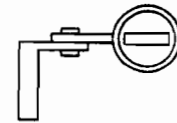
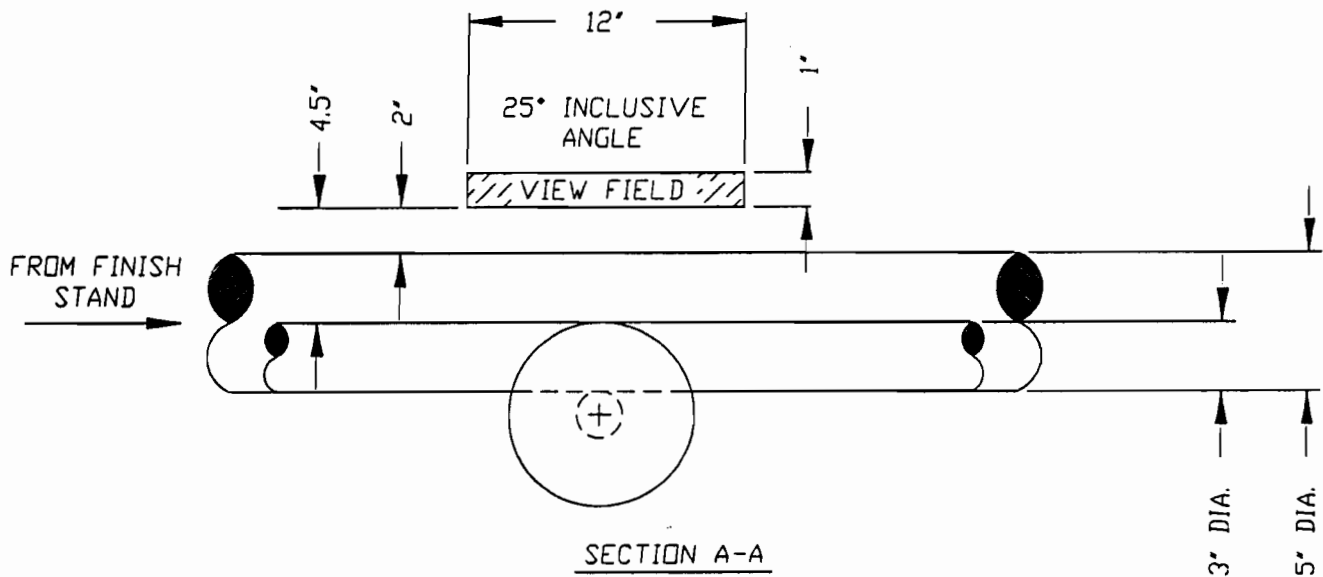


FOTO-CAPTOR TYPE 1347.--
OR
REMOTE LENS TYPE 1004

FOTO-CAPTOR
MOUNTING CONFIGURATION



SHOWN WITH MOUNTING LUG
AT 9 O'CLOCK POSITION TO
ORIENTATE THE 25° VIEW ANGLE
ON A HORIZONTAL PLANE AND
THE 2° VIEW ANGLE ON A
VERTICAL PLANE.



SECTION A-A

3" DIA.
5" DIA.

- WITH THE ABOVE CONFIGURATION THE FOTO-CAPTOR (HMD) WILL SEE ANY VERTICAL PASS LINE CHANGE THAT ENTERS IT'S VIEWING FIELD.
- THE 2'-0" FOTO-CAPTOR TO MILL DIMENSION MAY BE CHANGED TO SUIT SPECIFIC MILL LAYOUTS. REFER TO SCAN AREA-DISTANCE CHART.

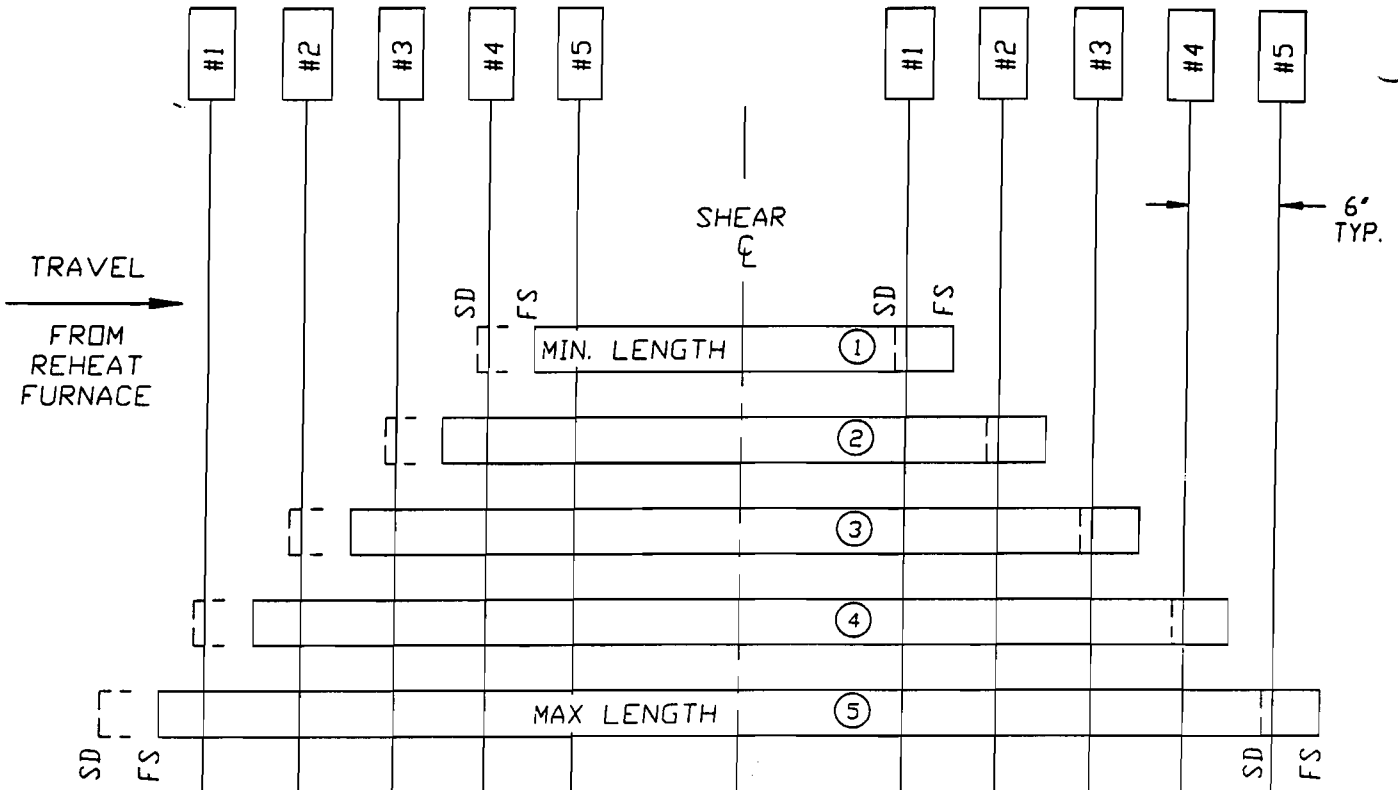
DRAWN BY: <i>CHIP</i>	DATE: 07/10/90	REV	DESCRIPTION	BY	DATE	TITLE
CHECKED BY:						BAR MILL PASS LINE DEVIATION AUTO DETECTION
PAGE 1 OF 1	SCALE NONE					
DWG. No.:	003-6					

weber sensors inc.
P.O. BOX 203, N LIMA, OH 4442
(216)-549-5746
ENGINEERED SOLUTIONS

BILLET SPLITTING APPLICATION

ENTRY FOTO-CAPTORS

EXIT FOTO-CAPTORS

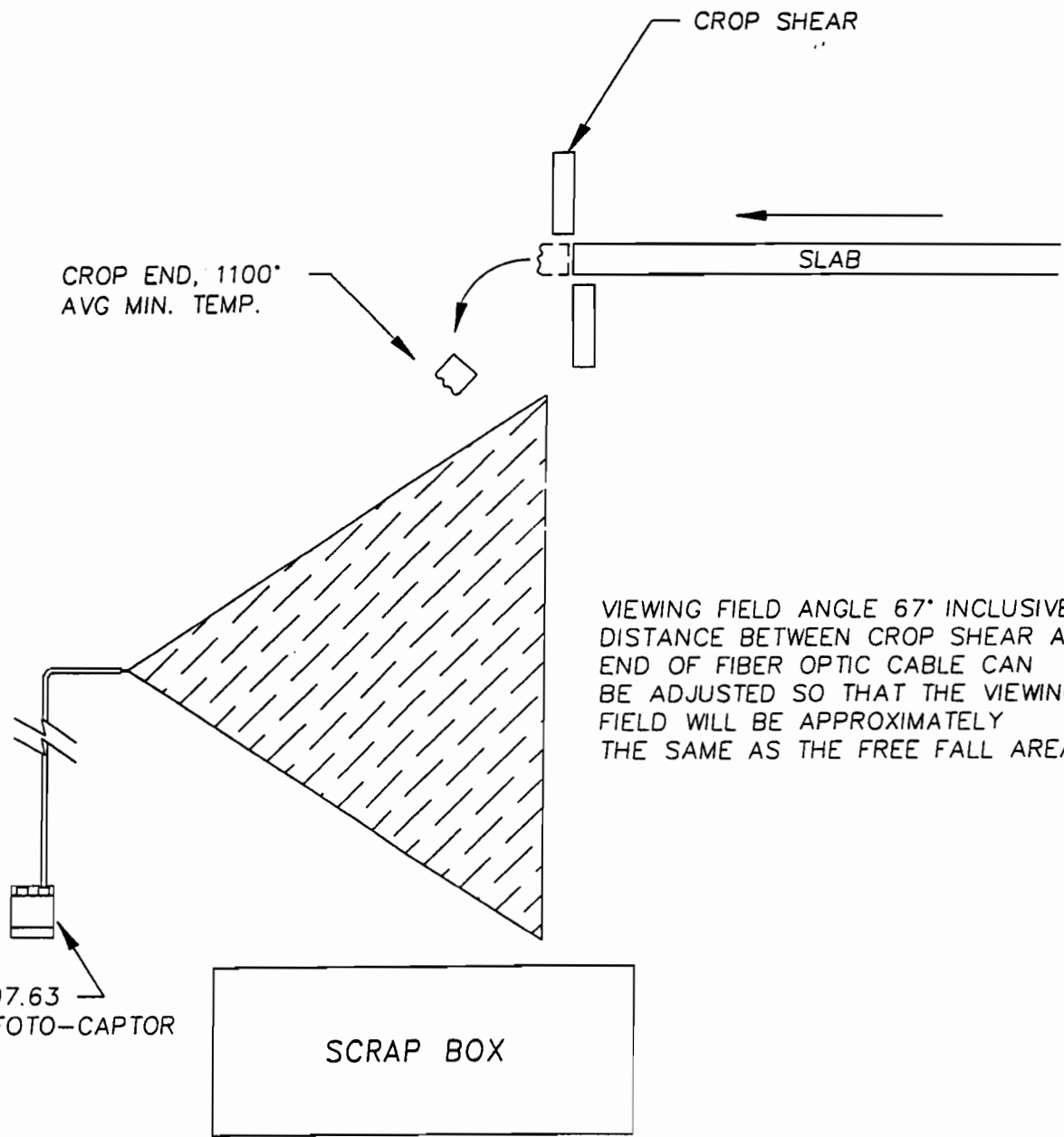


	LENGTH	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5
①	SLOWDOWN ○ FINAL STOP ○	○	○	○	●	●	○	○	○	○	○
②	SLOWDOWN ○ FINAL STOP ○	○	○	●	●	●	●	○	○	○	○
③	SLOWDOWN ○ FINAL STOP ○	○	●	●	●	●	●	●	○	○	○
④	SLOWDOWN ● FINAL STOP ○	●	●	●	●	●	●	●	●	○	○
⑤	SLOWDOWN ● FINAL STOP ●	●	●	●	●	●	●	●	●	●	●

SD = SLOWDOWN ● = ENERGIZED
FS = FINAL STOP ○ = DE-ENERGIZED

ABOVE SYSTEM UTILIZED 800° C. RESPONSE TEMPERATURE FOTO-CAPTORS WITH A 2 X 25° VIEWING FIELD, ALL SPACED EQUALLY AROUND THE SHEAR CENTERLINE AT AN APPROXIMATE (3) FT. DISTANCE. SPLIT CUT ACCURACY IS ± 3". AVERAGE BILLET TEMPERATURE WAS 2200° F.

DRAWN BY: <i>CHIP</i>	DATE: 07/09/90	REV	DESCRIPTION	BY	DATE	TITLE	weber sensors inc. P.O. BOX 203, N. LIMA, OH 47 (216)-549-5746 STATE-OF-THE-ART
CHECKED BY:						BILLET SPLITTING APPLICATION	
PAGE 1 OF 1	SCALE NONE						
DWG. No.: 003-4							



VIEWING FIELD ANGLE 67° INCLUSIVE.
 DISTANCE BETWEEN CROP SHEAR AND
 END OF FIBER OPTIC CABLE CAN
 BE ADJUSTED SO THAT THE VIEWING
 FIELD WILL BE APPROXIMATELY
 THE SAME AS THE FREE FALL AREA

APPLICATION: DETECT CROP END IN FREE FALL MODE
 TO CONFIRM CROP CUT IS MADE.

DRAWN BY:	DATE	REV	DESCRIPTION	BY	DATE	TITLE
CHIP	04/01/92					CROP SHEAR DROP OFF APPLICATION USING REMOTE UNIT W/ FIBER OPTIC CABLE
CHECKED BY:						
PAGE 1 OF 1	SCALE NONE					
DWG. No.:	003-20					

weber sensors inc.
 P.O. BOX 203, N. LIMA, OH
 (216)-549-5746
 ENGINEERED SOLUTIONS

