

Manual Drop Arm Barrier

(MDA4500)



Manufacture, Installation & Operation Guide

1. Performance Ratings

This barrier system has been designed as the latest iteration of the R&D process into a manually operated drop arm barrier. This barrier continues to be tested in accordance with PAS 68:2004 (MDA4500 was impact tested, the report number is B3925). This barrier design has been developed in conjunction with the testing program, and to date three previous iterations of this barrier have been impact tested, with the results of each test described below:

- *Test 1 (3,500kg vehicle travelling at a speed of 80km/h):*
The barrier restrained the vehicle impacting at 90°, with a penetration beyond the rear face of 4m and there was no dispersion of the load. Post test the vehicle was not driveable. This barrier has an aperture (width between stanchions) of 3m.

PAS 68:2004 designation for this barrier is:

V Manual Drop Arm Barrier 3500 80/4.0/0/90

- *Test 2 (3,500kg vehicle travelling at a speed of 80km/h):*
The barrier restrained the vehicle impacting at 90°, with a penetration beyond the rear face of 2.23m and there was no dispersion of the load. Post test the vehicle was not driveable and no other vehicle would have been able to pass through the barrier. This barrier has an aperture of 3m.

PAS 68:2004 designation for this barrier is:

V Manual Drop Arm Barrier 3500 80/2.23/0/90

- *Test 3 (7,500kg vehicle travelling at a speed of 48km/h):*
The barrier restrained the vehicle impacting at 90°, with a penetration beyond the rear face of 0m and there was no dispersion of the load. Post test the vehicle was not driveable and no other vehicle would have been able to pass through the barrier. This barrier has an aperture of 3m.

PAS 68:2004 designation for this barrier is:

V Manual Drop Arm Barrier 7500 48/0/0/90

The most recent iteration of this barrier has undergone some notable changes from the earlier versions which are; a wider gate aperture (this has been increased from a three metre aperture to a four and a half metre aperture) and shallower embedment of the foundations (this has been decreased from a 1000mm depth to a 500mm depth).

- *Test 4 (7,500kg vehicle travelling at a speed of 48km/h):*
The barrier restrained the vehicle impacting at 90°, with a penetration beyond the rear face of 0m and there was no dispersion of the load. Post test the vehicle was not driveable. The gate was partially operable after the impact and could be operated in the normal way, however would not open fully. Due to the extent of the damage during impact it is likely that only a passenger car or 4x4 vehicle would have been able to pass under it, when opened as far as the deformation would allow.

PAS 68:2004 designation for this barrier is:

V Manual Drop Arm Barrier 7500 48/0/0/90

2. Manufacture

The manufacture of the Manual Drop Arm Barrier is in accordance with the drawings and material details specified, as shown in *Appendix A* of this document.

3. Installation

The following steps describe the recommended method of installation of the barrier.

- a. Excavate the foundations to the dimensions specified (*see Appendix A*).

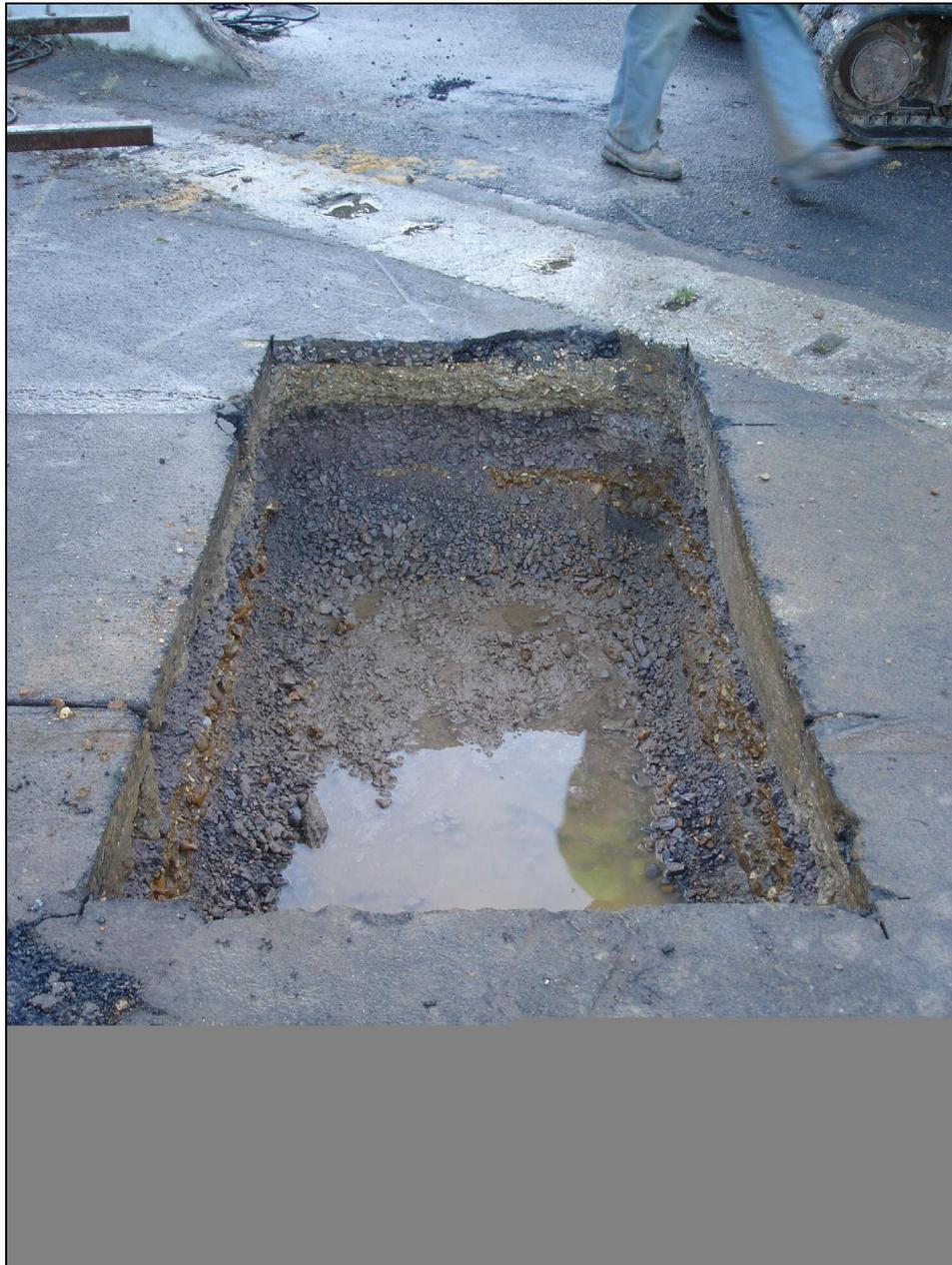


Figure 1: Excavated foundations.

- b. Attach guide rails to stanchion "A" at 900mm from the top of the base plate.

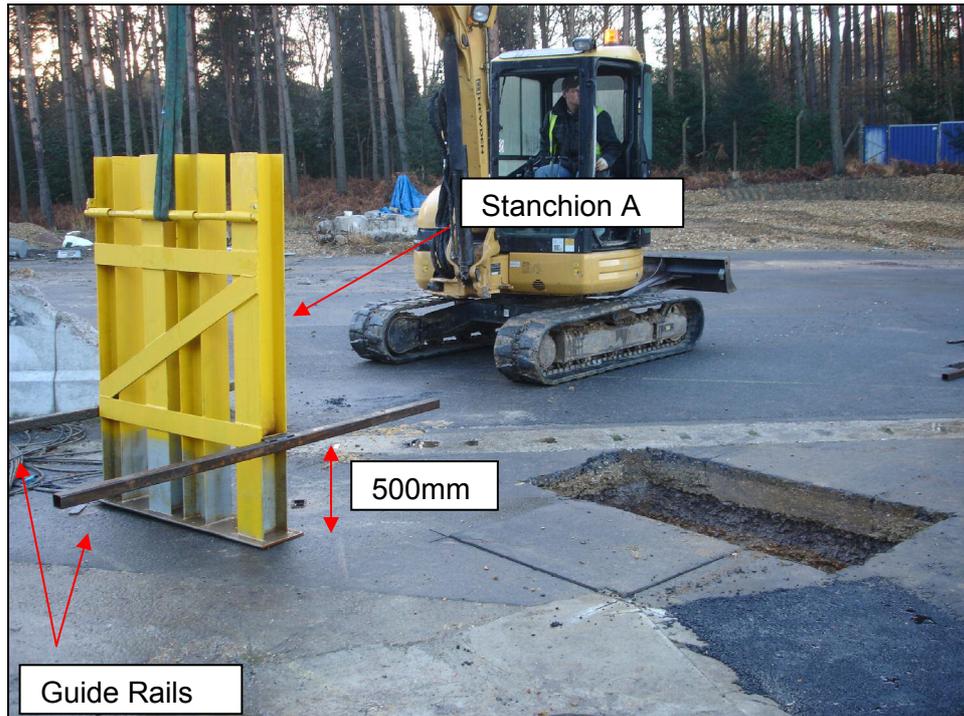


Figure 2: Guide rails are bolted to the foundation posts.

- c. Place stanchion "A" in to the corresponding foundation. The rails should act as an aid to sit the barrier square, level and at the correct height above ground.



Figure 3: The guide rails sit across the excavated foundation.

- d. Attach guide rails to stanchion "B" and place into the corresponding excavated foundation.

**Note: This should be done without the barrier arm attached.*



Figure 4: Repeat stage "b" and "c" for the second foundation post.

- e. Once both stanchions are positioned lower the arm into position, small adjustments can be made to provide the 4.5m aperture width and ensure that the barrier arm is parallel to the ground.

**Note: Check that the barrier arm does not foul against the posts of stanchion "A".*



Figure 5: Once orientated, adjust the barrier position and levels.



Figure 6: Once orientated, adjust the position and levels and insert the pivot.

- f. Remove any groundwater from the excavated foundations and pour the concrete around each stanchion. The mixture should spread evenly using a vibrating device to ensure a consistent filling of each excavation.
- g. Level the concrete and wait for it to set before removing the guide rails. See local site guidance for concrete curing time.
- h. Fix the main ballast weight into position (after the concrete has cured), and secure with bolts from underneath.



Figure 6: Main ballast weight.

- i. Once the barrier is in position, ballast is added. See *Appendix A*, “manual operation and ballasting criteria” for a guide to ballasting. In the example, approx 20kg of additional steel ballast was added to assist in the ‘fine tuning’ of the barrier.

**Note: it is important that the ballast is arranged correctly to keep the center of gravity of the barrier arm in the correct place. See “manual operation and ballasting criteria”.*

- j. A cord should then be attached to the barrier arm through the eye at the lock end, as an aid to controlling the opening and closing of the barrier.



Figure 7: Cord used to control the opening & closing operation.

- k. Undertake post-installation inspection and commissioning before the barrier is operational.

4. Operational Instructions

- a. To open the barrier, unscrew lock bolts and hold down barrier while pulling out both locking bars. The barrier should fully open under the mass of the ballast.



- b. If needed, use the cord attached to the “lock-end” of the barrier arm to pull the barrier fully open or hold open while the vehicle passes through.



- c. To close, walk to the “lock-end” and use the cord to pull the barrier closed.



- d. To lock, return the barrier to the down position while pushing both locking bars back in place then re-tighten the lock bolts.



Appendix A

5. Parts List (see Figure 10 to relate parts numbers)

List of Parts & Materials					
No. Off	Description	Section (mm)	Length (mm)	Material Specification	Notes
4	Short stanchion post	152 x 152 x 23	1,400.0	Steel: EN10025-2 : S275JR +AR. U-Column 152 x 152 x 23 As rolled.	Universal column.
4	Long stanchion post		1,650.0		
4	Cross flat	75 x 10	1,104.8	Steel: EN10025 S275JR +AR	10mm flat.
2	Cross flat (diagonal)		1,304.0		
2	Brace flat	400 x 10	1,200.0		
2	Barrier arm	114.3 x 6.3	6,132.4	Cold formed welded strongbox 235 Circular hollow section to Corus specification TS 30 (Rev.1) Jan.02. Mill finish. Mill cut ends.	Circular hollow section.
4	Cross beam		600.0		
2	Cross beam (short)		290.0		
2	Cross beam (diagonal)		2,184.0		
1	Ballast block	350 x 100	1,000.0	Steel: EN10025 S275JR +AR	Solid steel blocks welded to form ballast, as per drawings
2	Ballast block	350 x 100	500.0		
4	Pivot supports	150 x 150 x 10	170.0		Square hollow section.
2	Baring cartridge (UCFCX-E)	Ø30 (internal)	195.0	Steel	See drawings for manufacturing detail.
2	Collar lock	-	20.0	-	BO PART
1	Bolt tube (Mid)	-	400.0	Steel	3mm thick tube. Advise allowing room for some movement for the lock bar as it can become very tight against the tube.
2	Bolt tube (End)	-	152.4		
1	Pivot bar	Ø30	1,145.0	Steel	Solid bar.
2	Lock bar		515.0		
2	Lock plate	46 x 5	55.0	Steel	5mm flat.
2	Angle	50 x 50 x 5	138.0	Steel	-
1	Return cord	-	≈ 8500	-	BO PART
2	Handle (Lock bar)	-	-	Thermoset plastic	BO PART: appropriate size, durability.
4	Handle (Barrier)	-	-		
7	Lifting eye	-	-	Steel	BO PART: Minimum lifting capability of 2 tonne to carry fully ballasted barrier arm and ballast box. Otherwise use higher rated eyes for lifting more mass.
2	Foundations	1000 x 500	1,800.0	Concrete: EN206-1 C40/50 (GB) CL 0.40 Dmax20 Slump50.	Advise a minimum concrete strength of C25.

Total lengths (mm):

Universal column (152x152x23):
Cross flat (75x10):
Circular hollow section (114.3x6.3):
Square hollow section (150x150x10):
Tube:
Ø30mm bar:

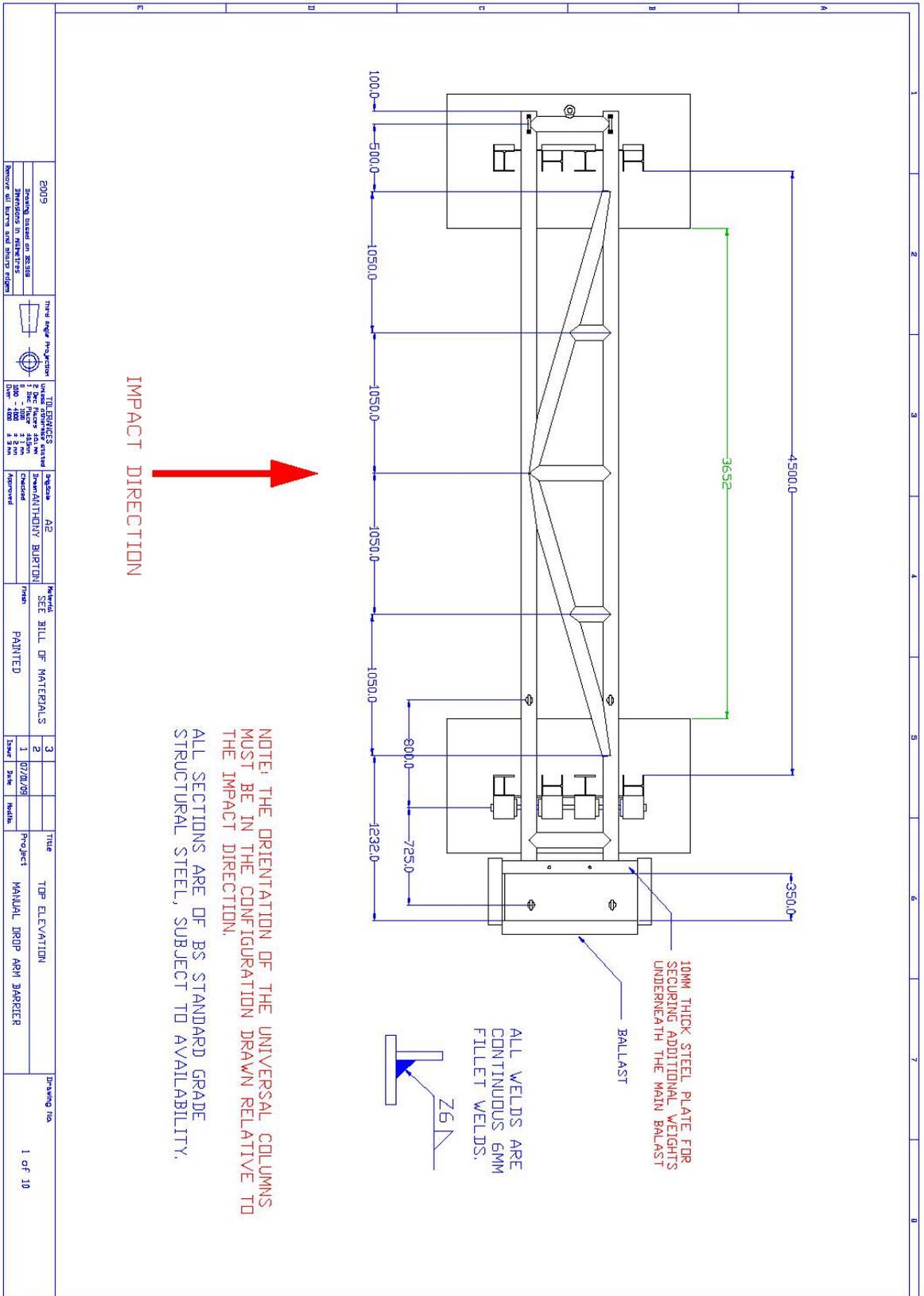
Length (mm)

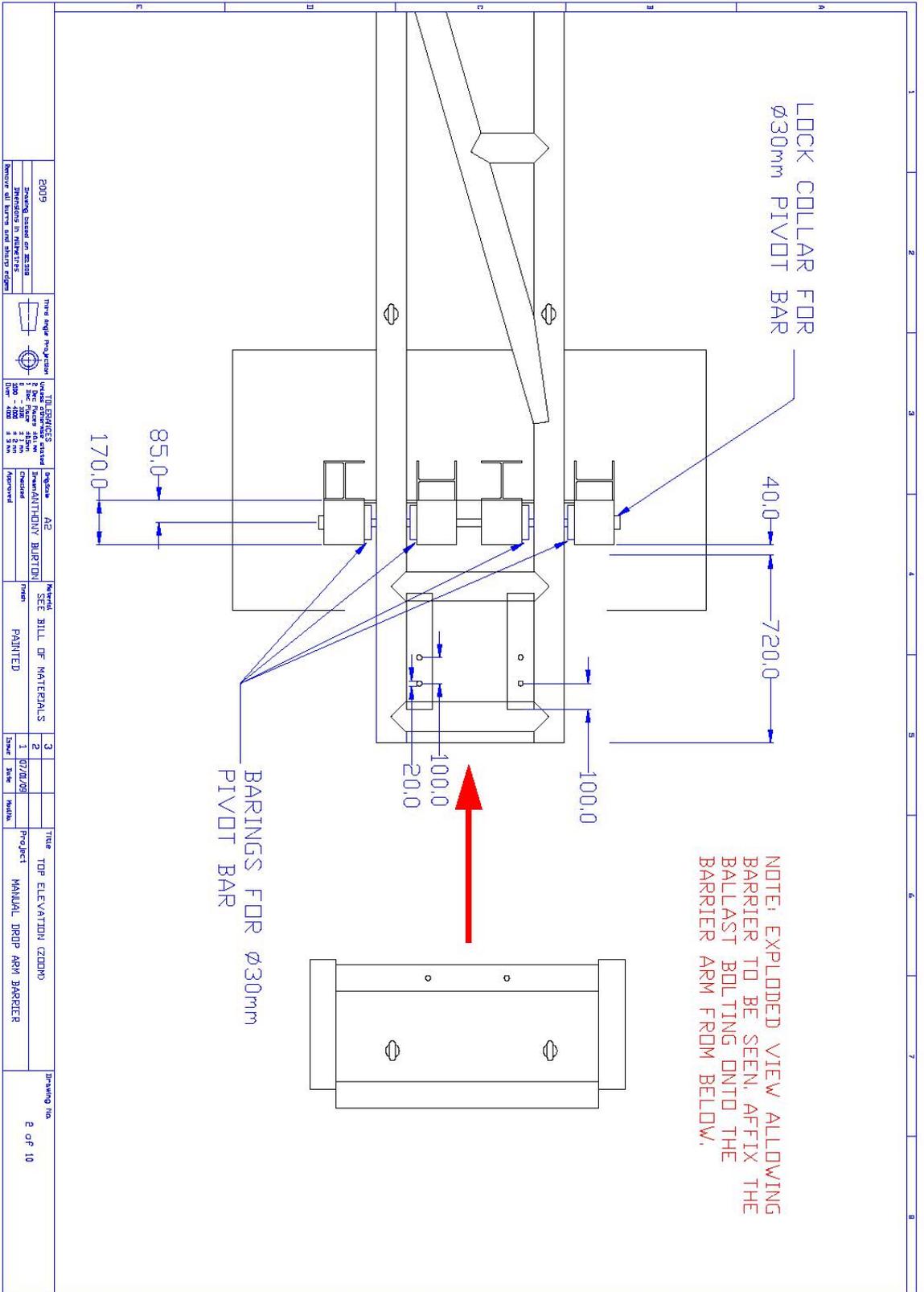
12,200.0
7,027.2
19,612.8
680.0
704.8
2,175.0

Welding Details:

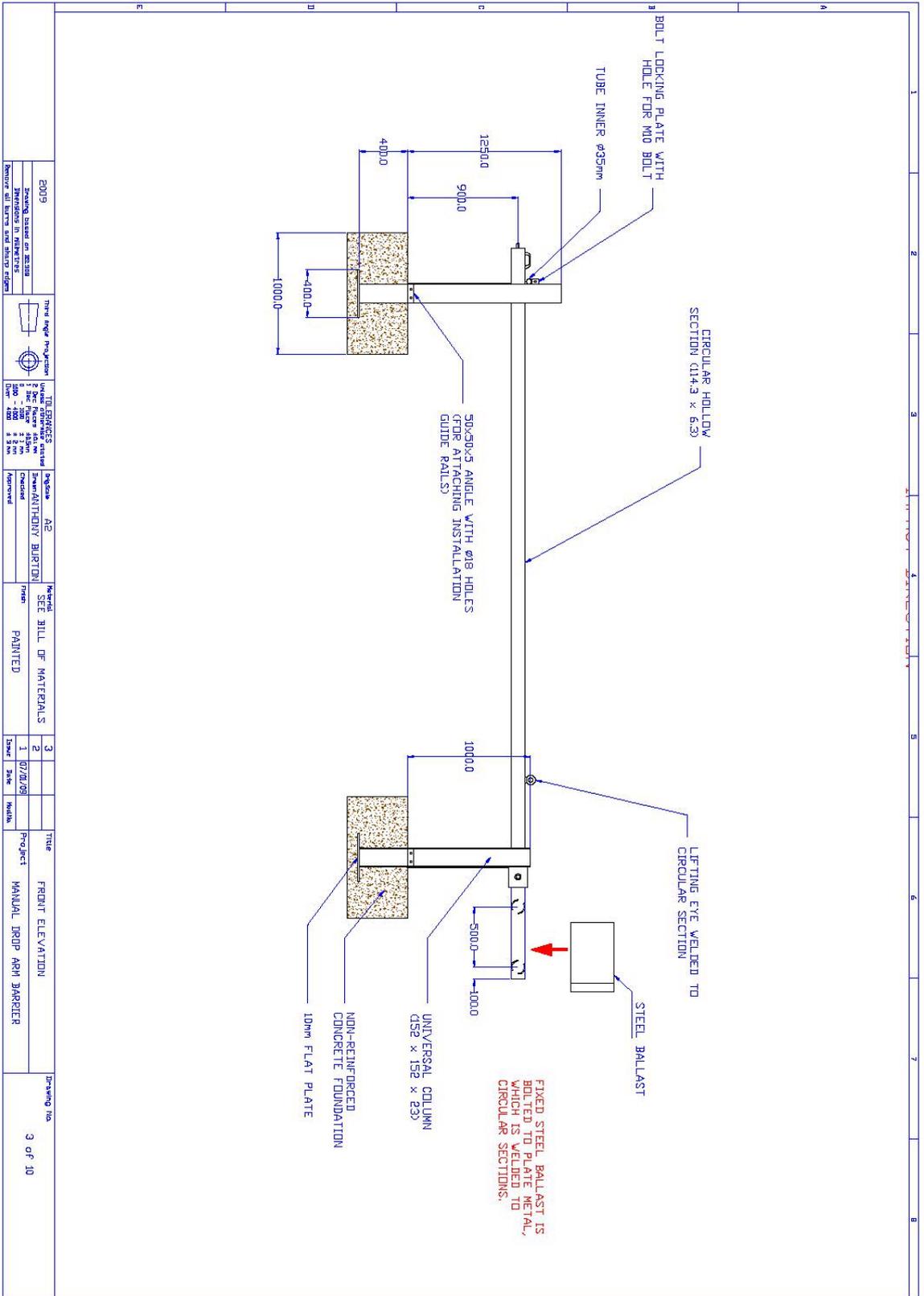
MIG Weld
Rod: SG-Drahtelektrode / wire electrode for GMAW. Boehler EMK 6/S. EN 440-G 42 2 C G3Si1/G 42 4 M G3Si1
Gas: FERROMAXX7 (90.5% Argon, 7% Carbon dioxide, 2.5% Oxygen).

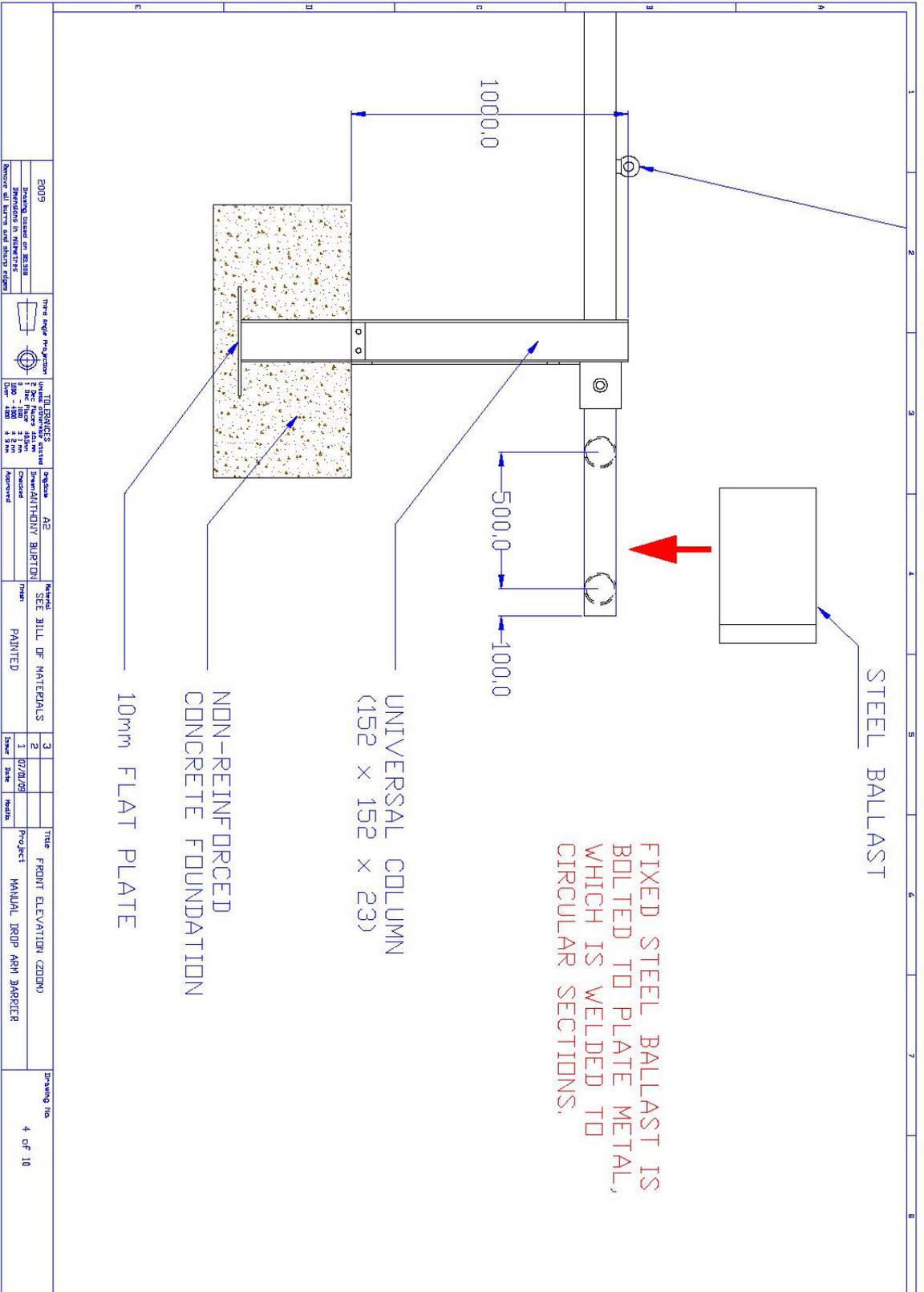
Engineering Drawings



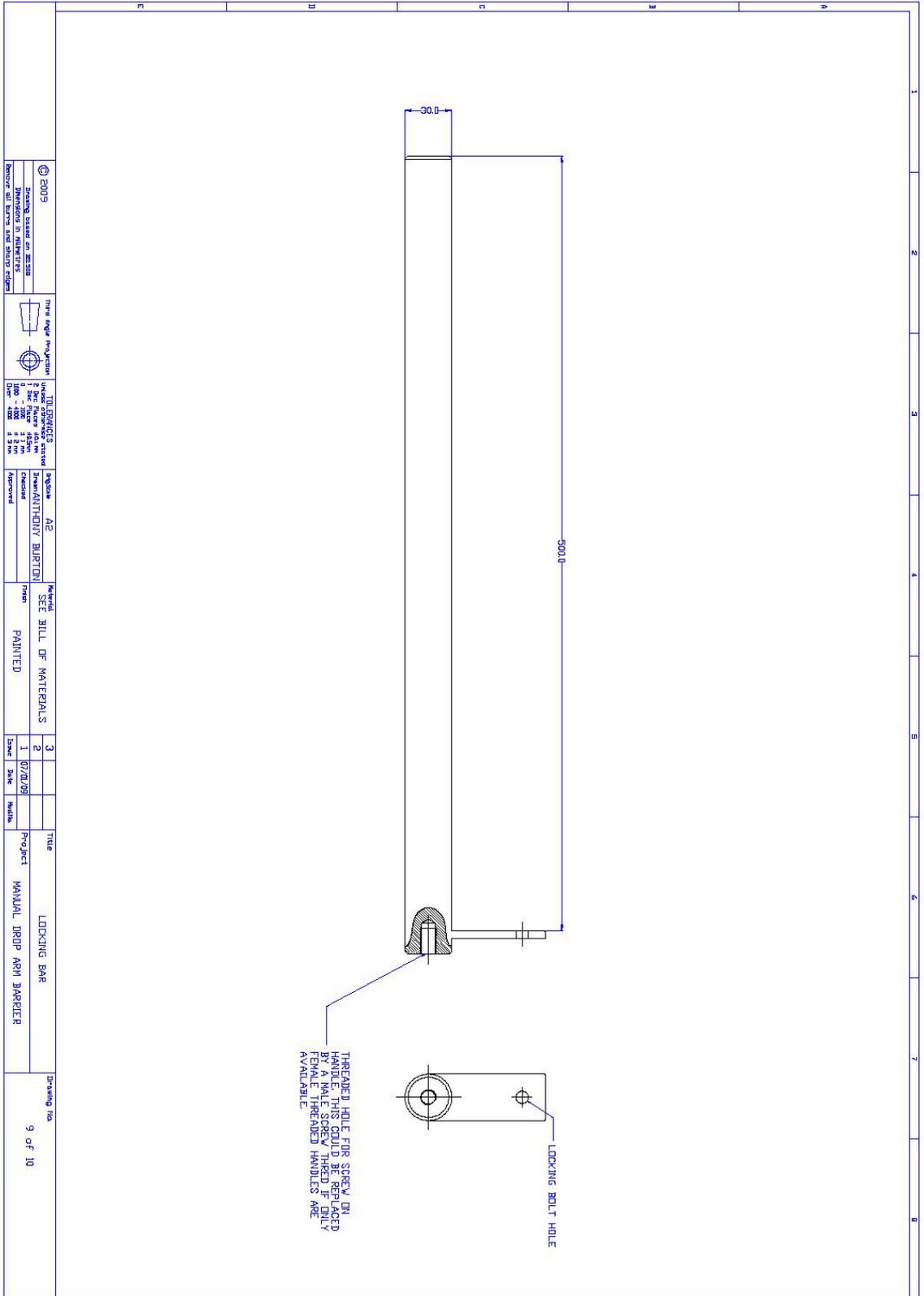


2009	THE ENGINEERS	Release	AS	Revised	SEE BILL OF MATERIALS	3	True	TOP ELEVATION (END)	Drawing No.
Issued based on AS3384	THE ENGINEERS	AS	AS	SEE BILL OF MATERIALS	3	1	07/20/08	Product	2 of 10
Dimensions in millimetres	THE ENGINEERS	AS	AS	PAINTED	3	1	07/20/08	MANUAL DRIP ARM BARRIER	
Remove all bolts and nuts before use	THE ENGINEERS	AS	AS		3	1	07/20/08		

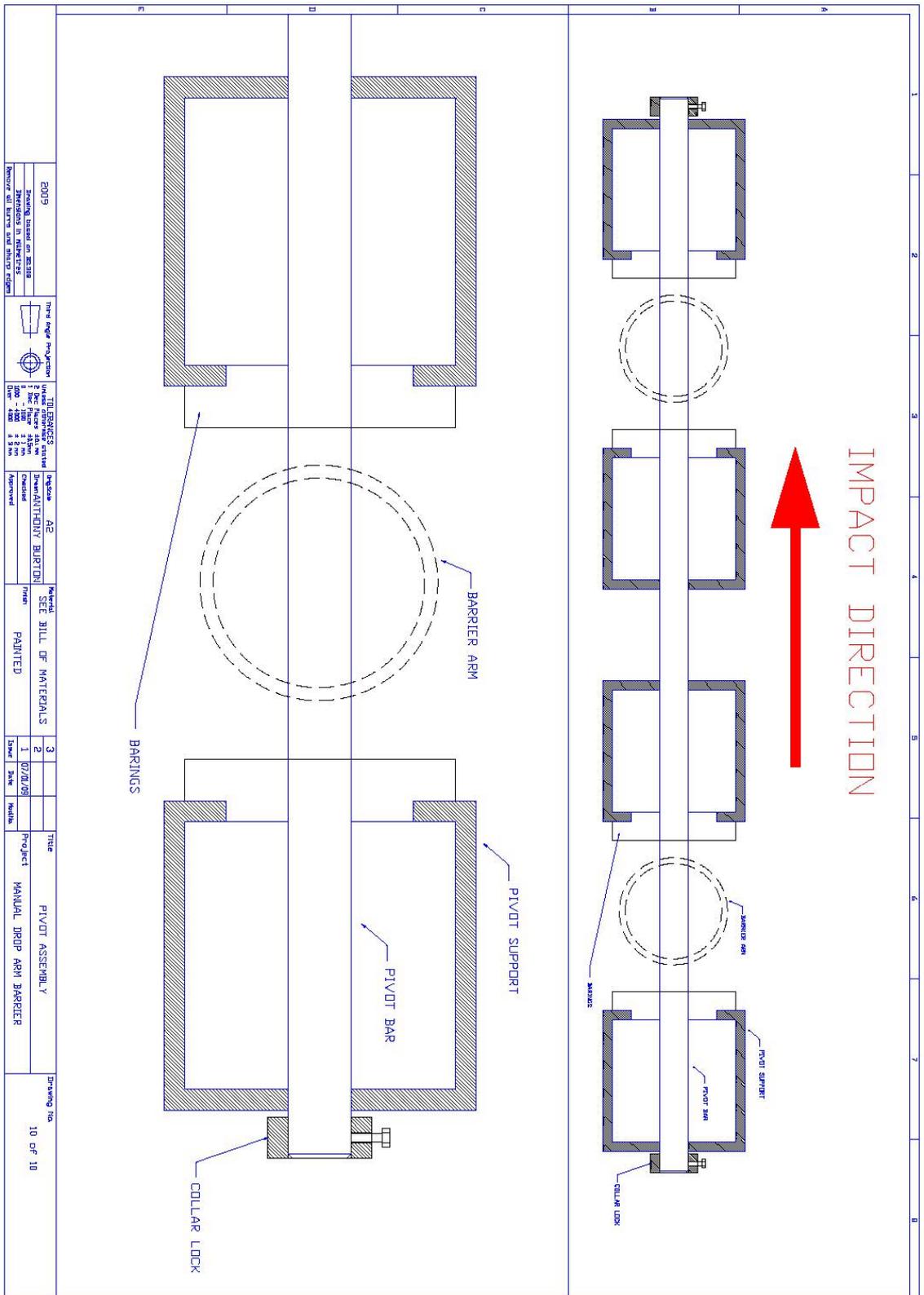




E009 Drawing based on revision DIMENSIONS IN METERS REMOVE ALL DIMS AND SHOTS FROM	TYPICAL PROJECT 	TITLE BLOCKS 1 100 - 100 2 100 - 100 3 100 - 100 4 100 - 100 5 100 - 100	DESIGN APPROVED	DESIGNER APPROVED	REVISIONS SEE BILL OF MATERIALS PAINTED	SHEET NO. 3 1 07/2008 2 1 07/2008 3 1 07/2008	PROJECT MANUAL DROP ARM BARRIER	DRAWING NO. 4 OF 10
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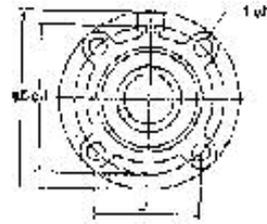
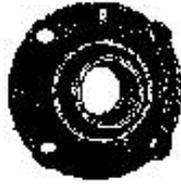
<p>© 2019 Drawing issued on 28/08/19 Revisions in blue Remove all blue and grey lines</p>		<p>UNIT CONVERSIONS 1 inch = 25.4 mm 1 foot = 304.8 mm 1 meter = 1.0936 yards 1 square meter = 1.196 square yards 1 cubic meter = 1.356 cubic yards</p>	<p>DESIGNED BY INVENTIVE BURTON</p>	<p>DATE 28/08/19</p>	<p>PROJECT MANUAL DROP ARM BARRETT</p>	<p>DRAWING NO. 9 of 10</p>
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D019 DRAWING ISSUED ON REQUEST DIMENSIONS IN MILLIMETERS REMOVE ALL BARRING AND SHIP TO CUSTOMER		THIS DRAWING IS THE PROPERTY OF THE COMPANY IT IS TO BE KEPT IN CONFIDENCE AND NOT TO BE REPRODUCED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF THE COMPANY		DESIGNER: [Signature] CHECKED: [Signature] APPROVED: [Signature]		MATERIAL SPEC. BILL OF MATERIALS PAINTED		DATE: 10/20/08 PROJECT: MANUAL DEPOT ARM BARRIER		DRAWING NO. 10 OF 10	
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Round flange cartridge type units

UCFCX-E
Cylindrical bore (with set screws)
d = 25 ~ 100 mm



Bore dia. mm	Bore dia. inch	Dimensions mm											Bore Size	Unit No.	Housing No.	Bearing No.
		L	FR	F	F ₁	N	A ₁	A ₂	A ₃	A ₄	A ₅	Ø				
25	1.0	43	36.0	9.5	13.0	7.5	7.5	7.5	7.5	7.5	1.500	0.952	M6	UCFCX025E	FCX025E	UCX025
30	1.2	50	42.5	11.0	15.0	9.0	9.0	9.0	9.0	1.500	1.067	M6	UCFCX030E	FCX030E	UCX030	
35	1.4	58	50.0	12.5	17.0	10.0	10.0	10.0	10.0	1.500	1.193	M6	UCFCX035E	FCX035E	UCX035	
40	1.6	65	57.5	14.0	19.0	11.0	11.0	11.0	11.0	1.500	1.320	M6	UCFCX040E	FCX040E	UCX040	
45	1.8	72	65.0	15.5	21.0	12.0	12.0	12.0	12.0	1.500	1.447	M6	UCFCX045E	FCX045E	UCX045	
50	2.0	80	72.5	17.0	23.0	13.0	13.0	13.0	13.0	1.500	1.574	M6	UCFCX050E	FCX050E	UCX050	
55	2.2	88	80.0	18.5	25.0	14.0	14.0	14.0	14.0	1.500	1.701	M6	UCFCX055E	FCX055E	UCX055	
60	2.4	95	87.5	20.0	27.0	15.0	15.0	15.0	15.0	1.500	1.828	M6	UCFCX060E	FCX060E	UCX060	
65	2.6	103	95.0	21.5	29.0	16.0	16.0	16.0	16.0	1.500	1.955	M6	UCFCX065E	FCX065E	UCX065	
70	2.8	110	102.5	23.0	31.0	17.0	17.0	17.0	17.0	1.500	2.082	M6	UCFCX070E	FCX070E	UCX070	
75	3.0	118	110.0	24.5	33.0	18.0	18.0	18.0	18.0	1.500	2.209	M6	UCFCX075E	FCX075E	UCX075	
80	3.2	125	117.5	26.0	35.0	19.0	19.0	19.0	19.0	1.500	2.336	M6	UCFCX080E	FCX080E	UCX080	
85	3.4	133	125.0	27.5	37.0	20.0	20.0	20.0	20.0	1.500	2.463	M6	UCFCX085E	FCX085E	UCX085	
90	3.6	140	132.5	29.0	39.0	21.0	21.0	21.0	21.0	1.500	2.590	M6	UCFCX090E	FCX090E	UCX090	
95	3.8	148	140.0	30.5	41.0	22.0	22.0	22.0	22.0	1.500	2.717	M6	UCFCX095E	FCX095E	UCX095	
100	4.0	155	147.5	32.0	43.0	23.0	23.0	23.0	23.0	1.500	2.844	M6	UCFCX100E	FCX100E	UCX100	

Remarks 1. In Part No. of unit, blank circles show bore diameter (mm) and (inch). (Bore Dia. 10.5 in Part 2)
2. Part No. of optional grease types are shown below.
A-1M-30UNF X05-X08
A-PT18 X10-X20