



<b>AEROSPACE STANDARD</b>	<b>MA2114</b>	<b>REV. A</b>
	Issued 1985-02 Revised 1988-02 Reaffirmed 2015-08	
Superseding MA2114		
Adapter - Port Connection, Ring Locked Installation and Removal of		

### RATIONALE

MA2114A has been reaffirmed to comply with the SAE five-year review policy.

#### 1. PURPOSE AND SCOPE:

This SAE Aerospace Standard provides the essential minimum design, installation and removal standard for MA 2111, MA 2112, and MA 2113 adapters and is applicable when specified on engineering drawings, or in procurement documents.

#### 2. GENERAL DESIGN INFORMATION:

- 2.1 These adapters provide a semi-permanent male fitting primarily for use in 28 000 kPa fluid systems compatible with titanium.
- 2.2 Adapters per MA 2111, MA 2112 and MA 2113 installed per this document into bosses and ports per MA2110 shall have a stand-off per dimension "P" Fig. 1 and Table I.
- 2.3 O-ring size per Table I and per MA 2010 must be used. The O-ring compound shall be specified by the using design activity and shall be selected based on system fluid and temperature.
- 2.4 The locking is driven into the mating port serrations after the adapter has been torqued. This prevents the adapter from rotating in the port during coupling nut assembly or disassembly and also eliminates the necessity of lock wiring the adapter. Only one wrench is required to install or remove the coupling nut.
- 2.5 Adapter removal is accomplished by lifting the locking out of the port using a removal tool per Table II.

AECMA interest: Future revisions of this standard shall be coordinated with AECM C-4.

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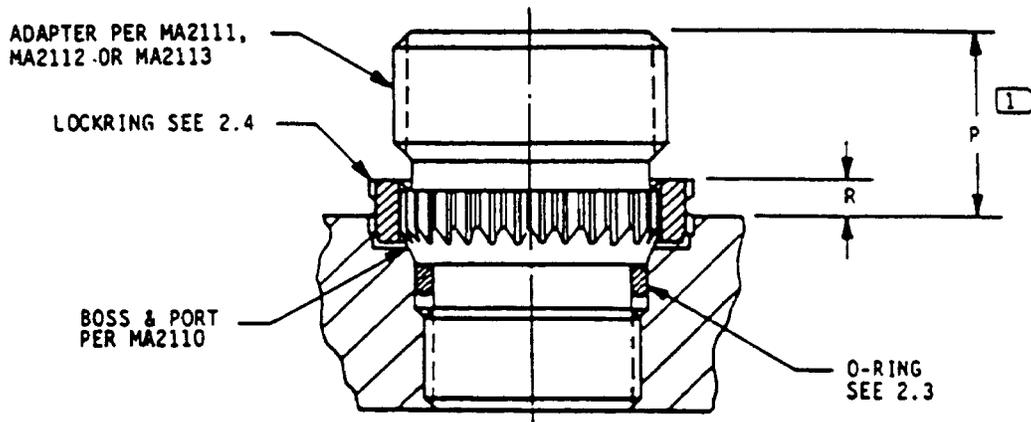


FIGURE 1 - INSTALLED ADAPTER

TABLE I

PORT NUMBER	ADAPTER DASH NUMBER			O-RING SIZE SEE 2.3	P ±0.50 1			R MAX
	MA2111	MA2112	MA2113		MA2111	MA2112	MA2113	
MA2110-077	05	05	04	A0045	10.80	12.60	10.80	3.20
MA2110-098	06	06	06	A0060	12.75	13.85	12.75	3.65
MA2110-125	08	08	--	A0080	15.00	15.35	-----	4.10
MA2110-136	10	10	08	A0095	15.00	16.30	15.00	4.10
MA2110-153	12	12	10	A0112	15.00	16.30	15.00	4.10
MA2110-170	14	14	12	A0132	15.20	16.30	15.20	4.10
MA2110-192	16	16	14	A0150	15.20	16.30	15.20	4.10
MA2110-214	18	--	16	A0170	15.00	-----	15.00	4.10
MA2110-231	20	20	18	A0190	15.60	16.90	15.60	4.10
MA2110-253	22	--	20	A0212	15.60	-----	15.60	4.10
MA2110-295	25	25	--	A0236	16.00	18.00	-----	4.10
MA2110-320	28	--	--	A0265	16.00	-----	-----	4.10
MA2110-350	32	--	--	A0300	16.00	-----	-----	4.10
MA2110-381	--	32	--	A0335	-----	19.10	-----	4.60
MA2110-452	--	40	--	A0387	-----	19.10	-----	4.60

1 "P" dimension is for design purpose only and not to be used as installation data.

TABLE II

PORT NUMBER	PORTING TOOL NUMBER ②	BROACH TOOL NUMBER ②	O-RING TOOL NUMBER ②	COMBINATION DRIVE TOOL AND WRENCH NUMBER ②	INSTALLATION TORQUE N·m	REMOVAL TOOL NUMBER ②
MA2110-077	RPTM077	RFMOPB077	ORTM0610	RFM077-1010DW	5.0- 6.0	RFM077LPDE
MA2110-098	RPTM098	RFMOPB098	ORTM0810	RFM098-1212DW	9.0- 12.0	RFM098LPDE
MA2110-125	RPTM125	RFMOPB125	ORTM1010	RFM125-1415DW	20.0- 24.0	RFM125LPDE
MA2110-136	RPTM136	RFMOPB136	ORTM1212	RFM136-1615DW	34.0- 40.0	RFM136LPDE
MA2110-153	RPTM153	RFMOPB153	ORTM1415	RFM153-1815DW	48.0- 56.0	RFM153LPDE
MA2110-170	RPTM170	RFMOPB170	ORTM1615	RFM170-2015DW	58.0- 66.5	RFM170LPDE
MA2110-192	RPTM192	RFMOPB192	ORTM1815	RFM192-2215DW	69.0- 78.0	RFM192LPDE
MA2110-214	RPTM214	RFMOPB214	ORTM2015	RFM214-2415DW	82.0- 91.5	RFM214LPDE
MA2110-231	RPTM231	RFMOPB231	ORTM2215	RFM231-2715DW	98.0-108.0	RFM231LPDE
MA2110-253	RPTM253	RFMOPB253	ORTM2415	RFM253-3015DW	106.0-117.0	RFM253LPDE
MA2110-295	RPTM295	RFMOPB295	ORTM2715	RFM295-3315DW	120.0-132.0	RFM295LPDE
MA2110-320	RPTM320	RFMOPB320	ORTM3015	RFM320-3615DW	137.0-152.0	RFM320LPDE
MA2110-350	RPTM350	RFMOPB350	ORTM3315	RFM350-3915DW	159.0-177.0	RFM350LPDE
MA2110-381	RPTM381	RFMOPB381	ORTM3615	RFM381-4220DW	180.0-200.0	RFM381LPDE
MA2110-452	RPTM452	RFMOPB452	ORTM4220	RFM452-5020DW	212.0-235.0	RFM452LPDE

② THIS PART REQUIRES SPECIAL TOOLING FOR PROPER INSTALLATION. THIS TOOLING IS AVAILABLE FROM ROSAN PRODUCTS, 3130 W. HARVARD ST, SANTA ANA, CA. 92704

### 3. DESIGN REQUIREMENTS:

3.1 Minimum data to be specified on Engineering drawing or Specification.

3.1.1 Boss diameter to be at least the minimum specified in 3.1.9, Table III.

3.1.2 Location of port.

3.1.3 Specific port size per MA 2110. If tap drill depth is not thru, then specify control dimensions.

3.1.4 Specific adapter size per MA 2111, MA 2112 or MA 2113.

3.1.5 Specific O-ring size and compound (see 2.3).

3.1.6 Install adapter per MA 2114.

3.1.7 Corrosion protection is specified in 4.2.4. If materials or fluids require primer different from zinc chromate primer or if an additional sealant is required, so specify.

3.1.8 Pressure testing of individual units is specified in 5.1. Testing other than that shown shall be specified.

3.1.9 The boss material for a 28 000 kPa system must have a minimum shear strength (at maximum system temperature) per Table III to resist the 112 000 kPa burst pressure (based on thread minimum shear engagement area shown).

TABLE III

PORT NUMBER	3	A	B	4	5	D	BOSS MATERIAL	BOSS DIAMETER MIN
		TOTAL THREAD MINIMUM SHEAR ENGAGEMENT AREA	PORT "D" MAX PER MA2110 REF	AXIAL LOAD ON ADAPTER DEVELOPED BY 112000 KPa BURST PRESSURE		BOSS MATERIAL MIN Fsu REQUIRED AT MAX SYSTEM TEMPERATURE TO RESIST AXIAL LOAD		
		mm <sup>2</sup>	mm	N		KPa		mm
MA2110-077		43.23	7.42	4843		112028		17.05
MA2110-098		69.35	9.38	7740		111601		19.05
MA2110-125		102.12	11.39	11412		111749		21.60
MA2110-136		135.12	13.11	15119		111891		24.15
MA2110-153		169.92	14.71	19034		112037		26.55
MA2110-170		219.12	16.69	24503		111825		27.95
MA2110-192		274.53	18.70	30760		112048		29.85
MA2110-214		337.55	20.71	37728		111771		33.05
MA2110-231		406.05	22.73	45447		111925		36.50
MA2110-253		479.76	24.71	53710		111952		38.85
MA2110-295		603.67	27.71	67543		111888		42.45
MA2110-320		741.78	30.73	83068		111985		46.00
MA2110-350		894.10	33.73	100079		111932		48.25
MA2110-381		1058.82	36.71	118543		111958		57.00
MA2110-452		1390.98	42.09	155836		112033		66.50

3 Minimum Shear Engagement Area shown is the assembled dimensional value for the overall engaged area of mating boss threads (boss threads full depth of adapter). It does not represent a dimension of either of the members in an unassembled condition.

4 "C" = Area x Burst Pressure = .7854 x B<sup>2</sup> x Burst Pressure.

5 "D" = C A

#### 4. INSTALLATION OF ADAPTER MA 2111, MA 2112 OR MA 2113 INTO BOSS PER MA2110:

##### 4.1 O-ring Installation:

- 4.1.1 Place the O-ring tool (per Table II) over the small thread of the fitting. Submerge the adapter, bullet and O-ring in the fluid to be used in the working system, or a lubricant compatible with the system fluid and all components. Slide the O-ring over the bullet and onto the fitting. Be sure that the O-ring is not twisted and is properly seated in the groove of the fitting. See Fig. 2.

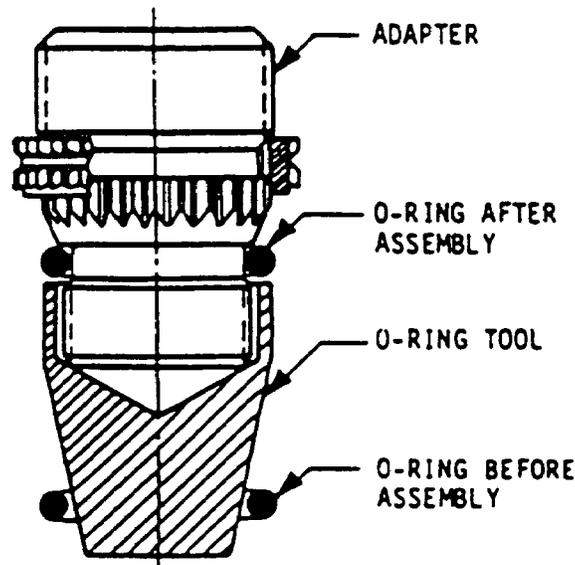


FIGURE 2

- 4.1.2 Remove the O-ring tool.
- 4.2 Install adapter assembly into boss port.
- 4.2.1 Lubricate the internal surfaces of the boss port and the entire adapter assembly using the same fluid or lubricant as specified in 4.1.1. Scratches, dings or rough spots are not allowed in O-ring contact area on the adapter or in the port.
- 4.2.2 Insert the smaller thread of the adapter into boss port by hand using a clockwise rotation until the adapter is seated. To avoid possible O-ring damage, the adapter should not be rotated in a counterclockwise direction.
- 4.2.3 Using the applicable combination wrench and drive tool in Table II, engage the serrations of the tool with those on the external serrations of the adapter locking per Fig. 3. Place a torque wrench of the proper size over the hex of the wrench and apply a torque equal to the minimum value specified in Table II. Note the relationship of the serrations of the locking with respect to the prebroached serrations in the port. If they match, proceed to 4.2.4. If the serrations do not match the prebroached serrations in the port, continue to slowly torque the adapter toward the maximum value allowed in Table II until the serrations of the locking match the boss serrations. This shall normally take between 3 and 8 degrees of turning and the maximum value need not be reached if the serrations align themselves prior to that value. Do not exceed maximum torque values.
- 4.2.4 Apply enough zinc chromate primer (MIL-P-8585) with a brush or small syringe to the counterbore area of the boss and below the adapter locking so primer will be extruded out between external serrations of the locking and the serrations in the port when locking is installed. Note: Using design activity may specify another primer in place of, or in addition to, zinc chromate (see 3.1.7).

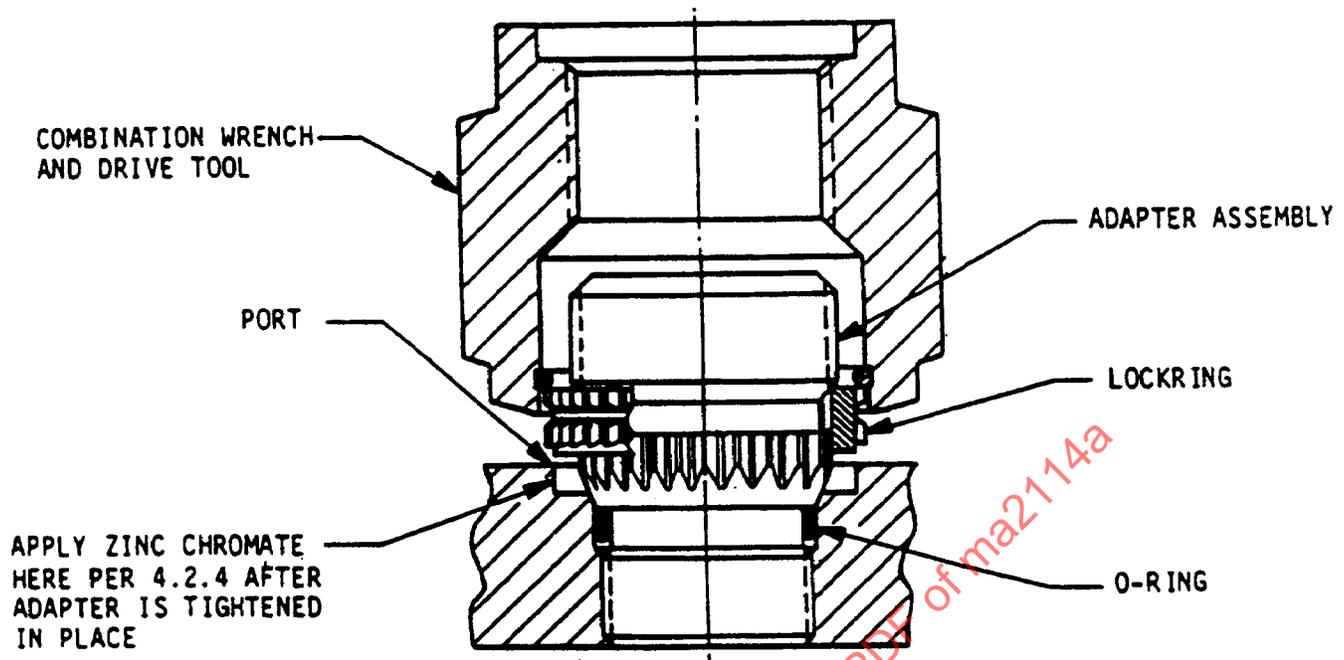


FIGURE 3 - Torquing Adapter Assembly

- 4.2.5 While the zinc chromate (or other primer) applied per 4.2.4 is still wet, install the lockring by rotating the threaded end of the combination wrench and drive tool clockwise onto the adapter assembly until it touches the lockring. Using an open end or socket wrench on the tool, turn the tool in a clockwise direction until it bottoms on the boss surface as shown in Fig. 4. Visually observe that the tool has bottomed. Caution: Any sudden increase in torque prior to bottoming may indicate that the lockring serrations and the port serrations are not aligned. If this occurs, remove wrench and drive tool by turning counterclockwise. Lift the lockring per 6.2. Continue to tighten fitting clockwise per 4.2.3 until serrations in boss and the external serrations on the lockring are aligned. Again attempt to install lockring. Remove excess primer on surface of boss and lockring.