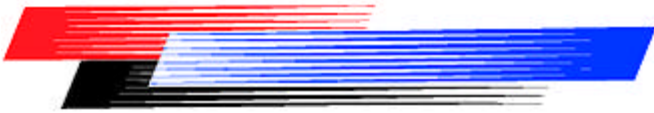


Fairchild Fasteners



Santa Ana Operations

Metric Fluid Boss Adapters - 7017-490000-00 (MA2111 or EN3566) 2800 KPa Systems



Rosan/Aerospace Fastener Division, Fairchild Fastener Group, is a company with over forty years experience in the Design, Development and Manufacture of quality aerospace threaded fasteners and hydraulic system products. Our objective is to provide products that exhibit simple, reliable and maintenance free solutions to fastening and hydraulic system problems.

INDEX

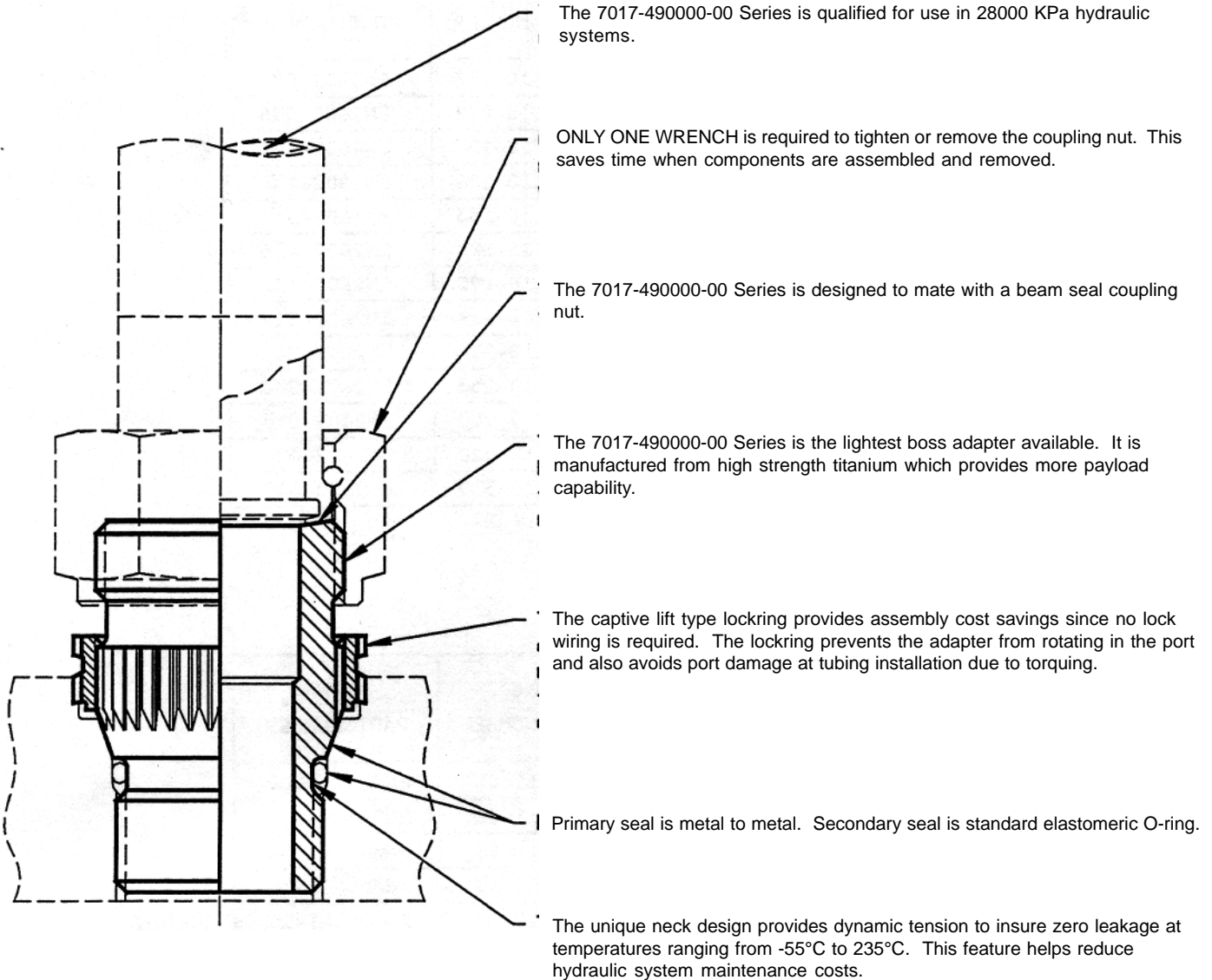
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TOOLING AND ADAPTER DIMENSIONS SHOWN IN THIS CATALOG ARE PROVIDED FOR ENVELOPE AND INSPECTION PURPOSES ONLY AND DO NOT INCLUDE DIMENSIONS FOR FABRICATION OF PRODUCTS

DIMENSIONS USED IN THIS CATALOG ARE METRIC PER S.I. SYSTEM.

The fluid adapters described in this catalog are protected by U.S. and related foreign patents. Rosan is a registered trademark in the United States and in foreign countries.

**FEATURES AND BENEFITS OF THE ROSAN
7017-490000-00 (MA2111 / EN3566)
SERIES METRIC ADAPTER**



Rosan Metric Fluid Adapters Series 7017-490000-00 have been tested and approved for use by the US Naval Air Development Center (Report No. NADC-85048-60) and the MBB Company, Germany, (Report No. MBB-TR-JF90-5).

These adapters are currently being used in the following programs:

- JAS39 Gripen Multirole Fighter - Sweden
- PAH-11 Tiger Helicopter - France/Germany
- RAH-66 Comanche Light Helicopter - US Army
- EFA Fighter - Europe

INTERCHANGEABILITY TABLES
ROSAN vs SAE AND AECMA

TABLE I - PORT

| ROSAN PORT NUMBER | SAE PORT NUMBER | AECMA PORT NUMBER |
|----------------------|--------------------|----------------------|
| PS10047-077 | MA2110-077 | EN2602-077 |
| PS10047-098 | MA2110-098 | EN2602-098 |
| PS10047-125 | MA2110-125 | EN2602-125 |
| PS10047-136 | MA2110-136 | EN2602-136 |
| PS10047-153 | MA2110-153 | EN2602-153 |
| PS10047-170 | MA2110-170 | EN2602-170 |
| PS10047-192 | MA2110-192 | EN2602-192 |
| PS10047-214 | MA2110-214 | EN2602-214 |
| PS10047-231 | MA2110-231 | EN2602-231 |
| PS10047-253 | MA2110-253 | EN2602-253 |
| PS10047-295 | MA2110-295 | EN2602-295 |
| PS10047-320 | MA2110-320 | EN2602-320 |
| PS10047-350 | MA2110-350 | EN2602-350 |

TABLE II - ADAPTER

| ROSAN PART NUMBER | SAE PART NUMBER | AECMA PART NUMBER |
|----------------------|--------------------|----------------------|
| 7017-490610-05 | MA2111-05 | EN3566-0605 |
| 7017-490810-06 | MA2111-06 | EN3566-0806 |
| 7017-491010-08 | MA2111-08 | EN3566-1008 |
| 7017-491212-10 | MA2111-10 | EN3566-1210 |
| 7017-491415-12 | MA2111-12 | EN3566-1412 |
| 7017-491615-14 | MA2111-14 | EN3566-1614 |
| 7017-491815-16 | MA2111-16 | EN3566-1816 |
| 7017-492015-18 | MA2111-18 | EN3566-2018 |
| 7017-492215-20 | MA2111-20 | EN3566-2220 |
| 7017-492415-22 | MA2111-22 | EN3566-2422 |
| 7017-492715-25 | MA2111-25 | EN3566-2725 |
| 7017-493015-28 | MA2111-28 | EN3566-3028 |
| 7017-493315-32 | MA2111-32 | EN3566-3332 |

INTERCHANGEABILITY TABLES
ROSAN vs SAE AND AECMA

TABLE III - ADAPTER - REDUCER

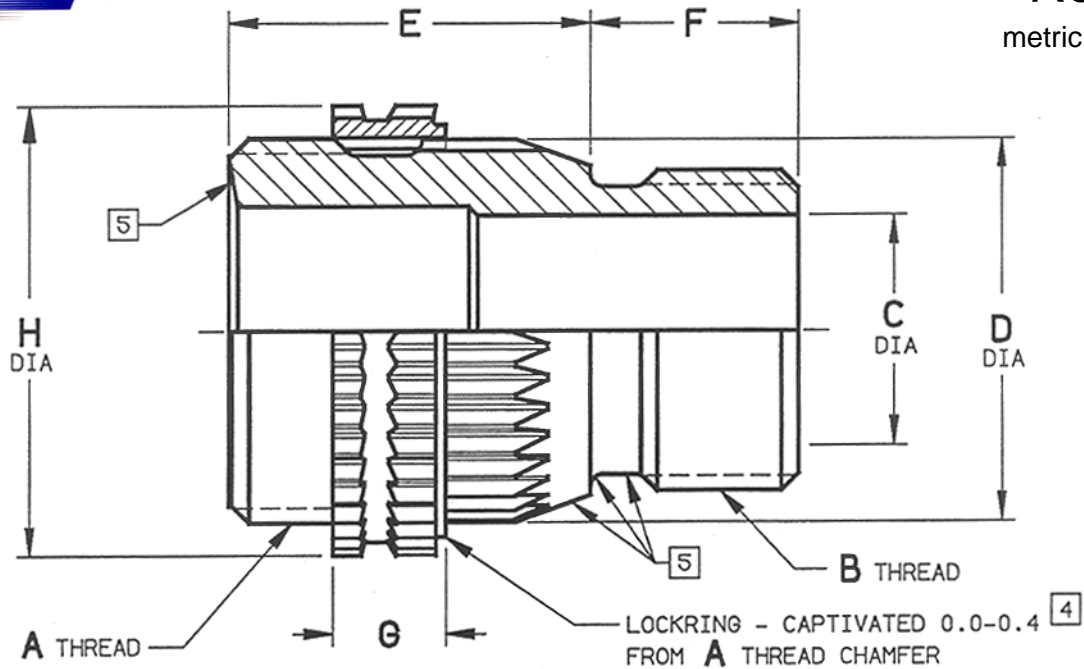
| ROSAN PART NUMBER | SAE PART NUMBER | AECMA PART NUMBER |
|-------------------|-----------------|-------------------|
| 7027-490810-05 | N/A | EN3248-0805 |
| 7027-491010-05 | N/A | EN3248-1005 |
| 7027-491010-06 | MA2119-8-06 | EN3248-1006 |
| 7027-491212-06 | MA2119-10-06 | EN3248-1206 |
| 7027-491212-08 | MA2119-10-08 | EN3248-1208 |
| 7027-491415-06 | MA2119-12-06 | EN3248-1406 |
| 7027-491415-08 | MA2119-12-08 | EN3248-1408 |
| 7027-491415-10 | MA2119-12-10 | EN3248-1410 |
| 7027-491615-06 | MA2119-14-06 | EN3248-1606 |
| 7027-491615-08 | MA2119-14-08 | EN3248-1608 |
| 7027-491615-10 | MA2119-14-10 | EN3248-1610 |
| 7027-491615-12 | MA2119-14-12 | EN3248-1612 |
| 7027-491815-12 | N/A | EN3248-1812 |
| 7027-491815-14 | N/A | EN3248-1814 |
| 7027-492015-14 | N/A | EN3248-2014 |
| 7027-492015-16 | N/A | EN3248-2016 |
| 7027-492215-14 | N/A | EN3248-2214 |
| 7027-492215-16 | N/A | EN3248-2216 |
| 7027-492415-16 | N/A | EN3248-2416 |
| 7027-492415-18 | N/A | EN3248-2418 |
| 7027-492715-22 | N/A | EN3248-2722 |
| 7027-493015-25 | N/A | EN3248-3025 |
| 7027-493315-28 | N/A | EN3248-3328 |

TABLE IV - CAP, HYDRAULIC FLUID AND FUEL

| ROSAN PART NUMBER | SAE PART NUMBER |
|-------------------|-----------------|
| RF70CM1010D | MA4248D05 |
| RF70CM1212D | MA4248D06 |
| RF70CM1415D | MA4248D08 |
| RF70CM1615D | MA4248D10 |
| RF70CM1815D | MA4248D12 |
| RF70CM2015D | MA4248D14 |
| RF70CM2215D | MA4248D16 |
| RF70CM2415D | MA4248D18 |
| RF70CM2715D | MA4248D20 |
| RF70CM3015D | MA4248D22 |
| RF70CM3315D | MA4248D25 |
| RF70CM3615D | MA4248D28 |
| RF70CM3915D | MA4248D32 |

TABLE V - CAP, SKYDROL AND PHOSPHATE

| ROSAN PART NUMBER | SAE PART NUMBER |
|-------------------|-----------------|
| RF70CM1010B | MA4248B05 |
| RF70CM1212B | MA4248B06 |
| RF70CM1415B | MA4248B08 |
| RF70CM1615B | MA4248B10 |
| RF70CM1815B | MA4248B12 |
| RF70CM2015B | MA4248B14 |
| RF70CM2215B | MA4248B16 |
| RF70CM2415B | MA4248B18 |
| RF70CM2715B | MA4248B20 |
| RF70CM3015B | MA4248B22 |
| RF70CM3315B | MA4248B25 |
| RF70CM3615B | MA4248B28 |
| RF70CM3915B | MA4248B32 |



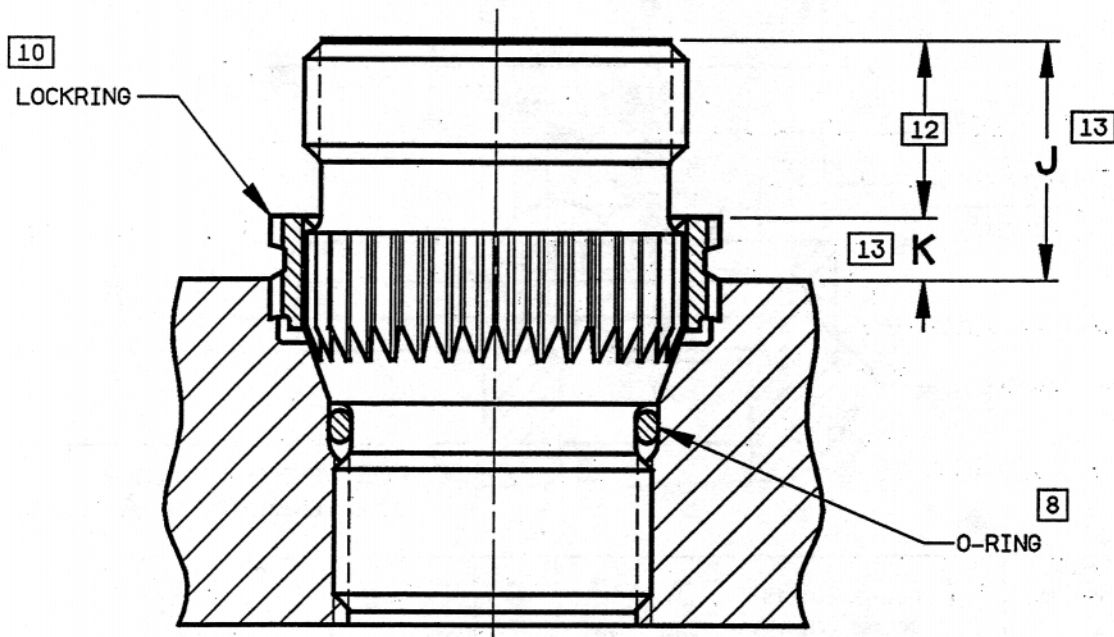
| ADAPTER PART NUMBER | TUBING OD | A THREAD MA1370 -4g6g | B THREAD MA1370 -4h6h | C DIA +0.20 0 | D DIA REF | E ±0.20 | F +0.50 0 | G ±0.20 | H DIA ±0.09 |
|---------------------|-----------|--------------------------------|--------------------------------|------------------------|-----------------|------------|-----------------|------------|-------------------|
| 7017-490610-05 | 5.0 | MJ10 X 1 | MJ6 X 1 | 2.50 | 9.37 | 16.35 | 7.95 | 5.30 | 12.90 |
| 7017-490810-06 | 6.0 | MJ12 X 1.25 | MJ8 X 1 | 4.40 | 11.53 | 18.85 | 8.60 | 6.10 | 14.75 |
| 7017-491010-08 | 8.0 | MJ14 X 1.5 | MJ10 X 1 | 6.10 | 13.87 | 21.60 | 9.30 | 7.00 | 17.80 |
| 7017-491212-10 | 10.0 | MJ16 X 1.5 | MJ12 X 1.25 | 7.70 | 15.37 | 21.60 | 10.00 | 7.00 | 19.50 |
| 7017-491415-12 | 12.0 | MJ18 X 1.5 | MJ14 X 1.5 | 9.00 | 17.12 | 21.65 | 10.65 | 7.00 | 21.00 |
| 7017-491615-14 | 14.0 | MJ20 X 1.5 | MJ16 X 1.5 | 10.70 | 18.77 | 21.85 | 11.30 | 7.00 | 22.60 |
| 7017-491815-16 | 16.0 | MJ22 X 1.5 | MJ18 X 1.5 | 12.50 | 20.93 | 21.85 | 12.00 | 7.00 | 26.40 |
| 7017-492015-18 | 18.0 | MJ24 X 1.5 | MJ20 X 1.5 | 14.20 | 23.85 | 22.65 | 12.70 | 7.00 | 28.00 |
| 7017-492215-20 | 20.0 | MJ27 X 1.5 | MJ22 X 1.5 | 15.90 | 24.92 | 23.25 | 13.35 | 7.00 | 30.20 |
| 7017-492415-22 | 22.0 | MJ30 X 1.5 | MJ24 X 1.5 | 17.65 | 27.41 | 23.25 | 14.00 | 7.00 | 33.70 |
| 7017-492715-25 | 25.0 | MJ33 X 1.5 | MJ27 X 1.5 | 20.20 | 31.47 | 23.65 | 15.05 | 7.00 | 37.00 |
| 7017-493015-28 | 28.0 | MJ36 X 1.5 | MJ30 X 1.5 | 22.80 | 33.60 | 23.65 | 16.05 | 7.00 | 40.70 |
| 7017-493315-32 | 32.0 | MJ39 X 1.5 | MJ33 X 1.5 | 25.40 | 37.57 | 23.65 | 17.05 | 7.00 | 43.00 |

NOTES: UNLESS OTHERWISE SPECIFIED

- MATERIAL: ADAPTER: 6Al-4V titanium per AMS-4928 or AMS-4967, 900 MPa UTS min.
LOCKRING: A286 corrosion resistant steel per AMS-5731 or AMS-5734, 34-40 HRC.
- FINISH: ADAPTER: Dry film lubricant per MIL-L-46010, Type I, on all surfaces except flow hole and lockring.
LOCKRING: Passivate per QQ-P-35.
- All interior packages are marked per MIL-STD-129 and durably marked with the complete Rosán part number.
- Lockring retained on adapter by controlled interference fit. One tooth removed from external serration for identification purposes.
- Sealing surface: No visible defects. To be protected for shipment.

**ADAPTER-FLUID CONNECTION
BEAM SEAL (EN2604)
28000KPa, METRIC**

**7017-490000-00
SERIES**



**7017-490000-00 ADAPTER
INSTALLED IN ROSAN PS10047 (MA2110-EN2602) PORT
PER MA2114**

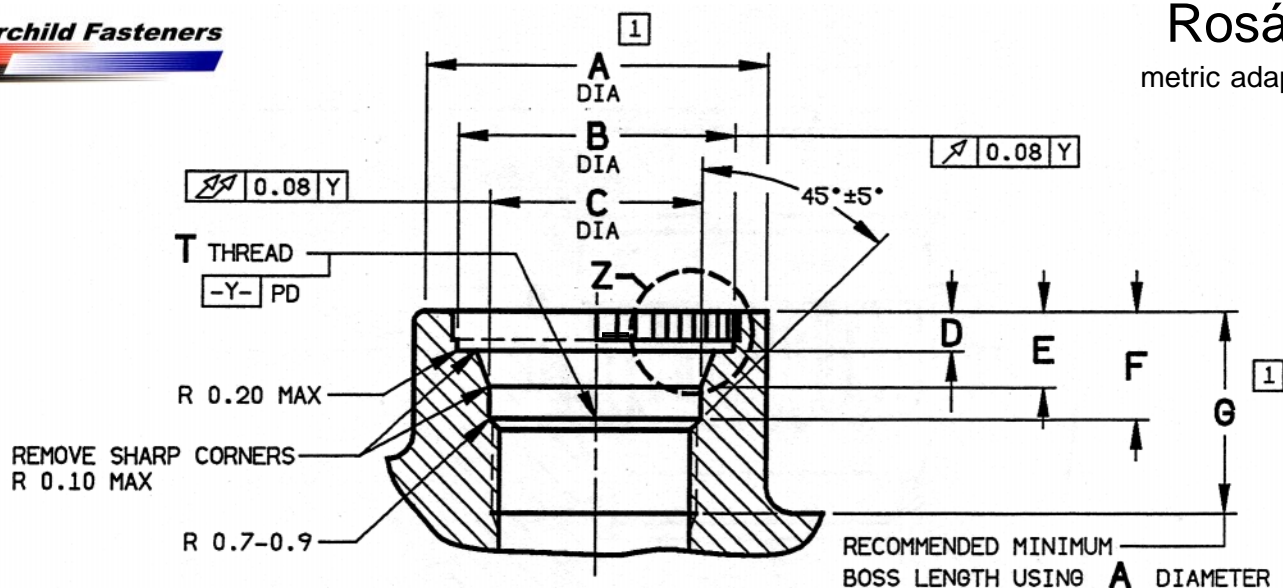
| ADAPTER PART NUMBER REF | O-RING NUMBER REF | J | K | ADAPTER WEIGHT Kg/100pcs APPROX |
|-------------------------|-------------------|-------|------|------------------------------------|
| | 8 | ±0.50 | MAX | |
| 7017-490610-05 | A0045 | 10.80 | 3.20 | 0.600 |
| 7017-490810-06 | A0060 | 12.75 | 3.65 | 0.870 |
| 7017-491010-08 | A0080 | 15.00 | 4.10 | 1.490 |
| 7017-491212-10 | A0095 | 15.00 | 4.10 | 1.750 |
| 7017-491415-12 | A0112 | 15.00 | 4.10 | 2.100 |
| 7017-491615-14 | A0132 | 15.20 | 4.10 | 2.500 |
| 7017-491815-16 | A0150 | 15.20 | 4.10 | 3.270 |
| 7017-492015-18 | A0170 | 15.00 | 4.10 | 3.700 |
| 7017-492215-20 | A0190 | 15.60 | 4.10 | 4.300 |
| 7017-492415-22 | A0212 | 15.60 | 4.10 | 4.900 |
| 7017-492715-25 | A0236 | 16.00 | 4.10 | 6.400 |
| 7017-493015-28 | A0265 | 16.00 | 4.10 | 7.670 |
| 7017-493315-32 | A0300 | 16.00 | 4.10 | 8.500 |

ENGINEERING INFORMATION

6. The 7017-490000-00 series provides a semi-permanent male adapter for use in any fluid system compatible with titanium.
7. Adapters will qualify to a 28000KPa working pressure system at -55°C to +235°C temperature range.
8. O-rings must be specified separately and shall be selected based on system fluid and temperature and are not supplied by Rosán. O-rings per SAE standard MA2010. (Ref: ISO/DIS4163/I).
9. These adapters are installed in Rosan ports per PS10047 as specified in Table IX, page 10.
10. The locking is driven into the port counterbore after adapter has been torqued. The locking eliminates adapter rotation and prevents port damage during tubing installation. One wrench is used to install or remove coupling nuts.
11. Adapter removal is accomplished by lifting the locking out of the port using the removal toll described on page 12.
12. Dimensions and finish of tube end in this area are per AECMA standard EN2604.
13. Stand-off dimensions are for design purposes only. Do not use as installation data.

**ADAPTER - FLUID CONNECTION
BEAM SEAL (EN2604)
28000KPa, METRIC**

**7017-490000-00
SERIES**



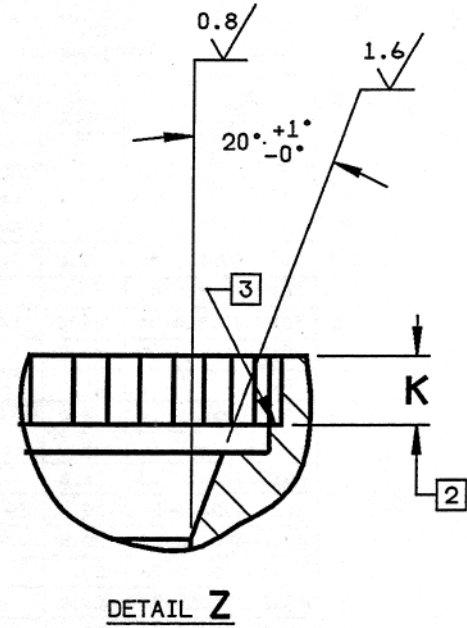
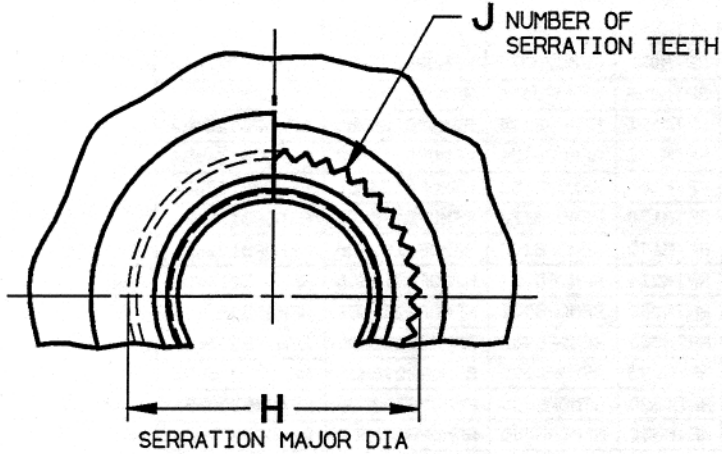
| PORT DASH NO. PS10047 MA2110 EN2602 | T THREAD, MA1370 CLASS-4H5H | | A | B | C | D | E | F | G |
|--|-----------------------------|-----------------------|---------------|-------------------|-------------------|-------------------|------------|------------|--------------------|
| | THREAD SIZE | CONTROLLED MINOR DIA. | MIN BOSS DIA. | DIA +0.08 0 | DIA +0.05 0 | DIA +0.25 0 | +0.13 0 | +0.13 0 | MIN FULL THD DEPTH |
| -077 | MJ6 X 1 | 5.141 5.065 | 17.05 | 12.01 | 7.37 | 2.90 | 5.26 | 8.40 | 14.20 |
| -098 | MJ8 X 1 | 7.141 7.065 | 19.05 | 14.02 | 9.33 | 3.30 | 5.82 | 9.00 | 15.40 |
| -125 | MJ10 X 1 | 9.141 9.065 | 21.60 | 17.04 | 11.34 | 3.80 | 6.36 | 9.50 | 16.65 |
| -136 | MJ12 X 1.25 | 10.898 10.821 | 24.15 | 18.64 | 13.06 | 3.80 | 6.36 | 9.50 | 17.35 |
| -153 | MJ14 X 1.5 | 12.652 12.576 | 26.55 | 20.22 | 14.66 | 3.80 | 6.36 | 9.50 | 18.00 |
| -170 | MJ16 X 1.5 | 14.652 14.576 | 27.95 | 21.82 | 16.64 | 3.80 | 6.36 | 9.50 | 18.65 |
| -192 | MJ18 X 1.5 | 16.652 16.572 | 29.85 | 25.40 | 18.65 | 3.80 | 6.36 | 9.50 | 19.30 |
| -214 | MJ20 X 1.5 | 18.652 18.576 | 33.05 | 27.05 | 20.66 | 3.80 | 7.36 | 10.50 | 21.00 |
| -231 | MJ22 X 1.5 | 20.652 20.576 | 36.60 | 29.36 | 22.68 | 3.80 | 7.36 | 10.50 | 21.70 |
| -253 | MJ24 X 1.5 | 22.652 22.576 | 38.85 | 32.54 | 24.66 | 3.80 | 7.36 | 10.50 | 22.35 |
| -295 | MJ27 X 1.5 | 25.652 25.576 | 42.45 | 36.04 | 27.66 | 3.80 | 7.36 | 10.50 | 23.40 |
| -320 | MJ30 X 1.5 | 28.652 28.576 | 46.00 | 39.67 | 30.68 | 3.80 | 7.36 | 10.50 | 24.40 |
| -350 | MJ33 X 1.5 | 31.652 31.576 | 48.25 | 42.06 | 33.68 | 3.80 | 7.36 | 10.50 | 25.40 |

NOTES: UNLESS OTHERWISE SPECIFIED

1 The minimum boss dia "A" and boss length "G" are satisfactory for use in materials that exhibit a minimum shear strength of 180 MPa at ambient temperature. For minimum shear strength at maximum temperature see note 1, page 9.

**PORT-FLUID CONNECTION
METRIC**

PS10047
(MA2110-EN2602)



| PORT DASH NO. | H | J | K |
|-----------------------------|------------|--------------------|------|
| PS10047 MA2110 EN2602 | DIA MIN | NUMBER OF TEETH | MIN |
| -077 | 13.13 | 23 | 1.90 |
| -098 | 15.01 | 27 | 2.30 |
| -125 | 18.08 | 31 | 2.70 |
| -136 | 19.76 | 40 | 2.70 |
| -153 | 21.29 | 38 | 2.70 |
| -170 | 22.89 | 40 | 2.70 |
| -192 | 26.72 | 38 | 2.70 |
| -214 | 28.30 | 43 | 2.70 |
| -231 | 30.45 | 46 | 2.70 |
| -253 | 34.01 | 36 | 2.70 |
| -295 | 37.34 | 47 | 2.70 |
| -320 | 41.25 | 32 | 2.70 |
| -350 | 43.33 | 53 | 2.70 |

NOTES: CONTINUED

- [2] The drill and porting tool method of preparing the machined cavity is mandatory. Drill 0.4-0.7 smaller than controlled minor diameter specified. The porting tool will size the minor diameter and provide balance of cavity configuration ready for broaching serration. Use of broach tool specified in Table VI, page 8 is mandatory to provide proper serrations.
- [3] After serrations are broached, chip removal is required.

**PORT-FLUID CONNECTION
METRIC**

**PS10047
(MA2110-EN2602)**

TABLE VI - PORT MACHINING TOOLS

| ADAPTER PART NUMBER REF | TUBING OD | PORT DASH NO. PS10047 MA2110 EN2602 | PORTING TOOL | SERRATION BROACH TOOLS (1 REQUIRED ONLY) 1 | | |
|-------------------------|-----------|--|--------------|---|--------------|--------------|
| | | | | IMPACT | NON-IMPACT | WOBBLE |
| 7017-490610-05 | 5.0 | -077 | RPTM077 | RFMOPB077 | RFMOPB077HDB | RFMOPB077WBA |
| 7017-490810-06 | 6.0 | -098 | RPTM098 | RFMOPB098 | RFMOPB098HDB | RFMOPB098WBA |
| 7017-491010-08 | 8.0 | -125 | RPTM125 | RFMOPB125 | RFMOPB125HDB | RFMOPB125WBA |
| 7017-491212-10 | 10.0 | -136 | RPTM136 | RFMOPB136 | RFMOPB136HDB | RFMOPB136WBA |
| 7017-491415-12 | 12.0 | -153 | RPTM153 | RFMOPB153 | RFMOPB153HDB | RFMOPB153WBA |
| 7017-491615-14 | 14.0 | -170 | RPTM170 | RFMOPB170 | RFMOPB170HDB | RFMOPB170WBA |
| 7017-491815-16 | 16.0 | -192 | RPTM192 | RFMOPB192 | RFMOPB192HDB | RFMOPB192WBA |
| 7017-492015-18 | 18.0 | -214 | RPTM214 | RFMOPB214 | RFMOPB214HDB | RFMOPB214WBA |
| 7017-492215-20 | 20.0 | -231 | RPTM231 | RFMOPB231 | RFMOPB231HDB | RFMOPB231WBA |
| 7017-492415-22 | 22.0 | -253 | RPTM253 | RFMOPB253 | RFMOPB253HDB | RFMOPB253WBA |
| 7017-492715-25 | 25.0 | -295 | RPTM295 | RFMOPB295 | RFMOPB295HDB | RFMOPB295WBA |
| 7017-493015-28 | 28.0 | -320 | RPTM320 | RFMOPB320 | RFMOPB320HDB | RFMOPB320WBA |
| 7017-493315-32 | 32.0 | -350 | RPTM350 | RFMOPB350 | RFMOPB350HDB | RFMOPB350WBA |

TABLE VII - INSTALLATION AND REMOVAL TOOLS

| ADAPTER PART NUMBER REF | INSTALLATION TOOLS | | | | LOCKRING REMOVAL TOOL |
|-------------------------|--------------------|-----------------------------------|--|--|-----------------------|
| | O-RING INSTL TOOL | COMBINATION WRENCH AND DRIVE TOOL | WRENCH 2 | LOCKING DRIVE TOOL 2 | |
| 7017-490610-05 | ORTM0610 | RFM077-1010DW | RFM6828-077W | RFM6828-077D | RFM077LPDE |
| 7017-490810-06 | ORTM0810 | RFM098-1212DW | RFM6828-098W | RFM6828-098D | RFM098LPDE |
| 7017-491010-08 | ORTM1010 | RFM125-1415DW | RFM6828-125W | RFM6828-125D | RFM125LPDE |
| 7017-491212-10 | ORTM1212 | RFM136-1615DW | RFM6828-136W | RFM6828-136D | RFM136LPDE |
| 7017-491415-12 | ORTM1415 | RFM153-1815DW | RFM6828-153W | RFM6828-153D | RFM153LPDE |
| 7017-491615-14 | ORTM1615 | RFM170-2015DW | RFM6828-170W | RFM6828-170D | RFM170LPDE |
| 7017-491815-16 | ORTM1815 | RFM192-2215DW | RFM6828-192W | RFM6828-192D | RFM192LPDE |
| 7017-492015-18 | ORTM2015 | RFM214-2415DW | RFM6828-214W | RFM6828-214D | RFM214LPDE |
| 7017-492215-20 | ORTM2215 | RFM231-2715DW | RFM6828-231W | RFM6828-231D | RFM231LPDE |
| 7017-492415-22 | ORTM2415 | RFM253-3015DW | RFM6828-253W | RFM6828-253D | RFM253LPDE |
| 7017-492715-25 | ORTM2715 | RFM295-3315DW | RFM6828-295W | RFM6828-295D | RFM295LPDE |
| 7017-493015-28 | ORTM3015 | RFM320-3615DW | RFM6828-320W | RFM6828-320D | RFM320LPDE |
| 7017-493315-32 | ORTM3315 | RFM350-3615DW | RFM6828-350W | RFM6828-350D | RFM350LPDE |

NOTES: UNLESS OTHERWISE SPECIFIED

- 1 Impact series are for broaching soft materials such as Aluminum, Magnesium or Mild Steel with hardness up to 32 HRC. Non-impact and Wobble series recommended for broaching materials with hardness up to 40 HRC.
- 2 The wrench and lockring drive tools shown are provided for the installation of reducers, resistors, filters and quick disconnects with Rosan port end configuration.

TOOLING

TABLE VIII - SHEAR AREA AND AXIAL LOAD

| ADAPTER PART NUMBER | PORT DASH NO. PS10047 MA2110 EN2602 | MINIMUM SHEAR ENGAGEMENT [2] mm ² | AXIAL LOAD ON ADAPTER DEVELOPED BY 112000 KPa BURST PRESSURE [1] NEWTON |
|---------------------|--|--|---|
| 7017-490610-05 | -077 | 43.23 | 4843 |
| 7017-490810-06 | -098 | 69.35 | 7740 |
| 7017-491010-08 | -125 | 102.12 | 11412 |
| 7017-491212-10 | -136 | 135.12 | 15119 |
| 7017-491415-12 | -153 | 169.92 | 19034 |
| 7017-491615-14 | -170 | 219.12 | 24503 |
| 7017-491815-16 | -192 | 274.53 | 30760 |
| 7017-492015-18 | -214 | 337.55 | 37728 |
| 7017-492215-20 | -231 | 406.05 | 45447 |
| 7017-492415-22 | -253 | 479.76 | 53710 |
| 7017-492715-25 | -295 | 603.67 | 67543 |
| 7017-493015-28 | -320 | 741.78 | 83068 |
| 7017-493315-32 | -350 | 894.10 | 100079 |

NOTES: UNLESS OTHERWISE SPECIFIED

- [1] The boss material at maximum operating temperature must have a minimum shear strength of 112MPa to resist burst pressure. See also note [1], page 6.
- [2] Minimum Shear Engagement Area shown is the assembled dimensional value for the overall engaged area of mating port threads (port threads full depth of adapter). It does not represent a dimension of either of the members in an unassembled condition.

DESIGN INFORMATION
28000 KPa OPERATING PRESSURE

PORT PREPARATION

1. Prepare boss and port per PS10047, page 6 and 7. Drill thru or to depth specified on applicable drawing. Use a drill with a diameter 0.4-0.7 smaller than the required thread minor diameter specified in standard PS10047. This will allow the Rosan RPTM porting tool to finish the thread minor diameter to the size required for piloting the broach tool.

O-RING INSTALLATION

2. Place the O-ring installation tool over the port end thread of the adapter. Submerge the tool and O-ring in the fluid to be used in the working system, or a lubricant compatible with the system fluid. Slide the O-ring over the tool and onto the adapter. Insure that the O-ring is not twisted and is properly seated in the groove of the adapter. See Figure 1.
3. Remove the O-ring installation tool.

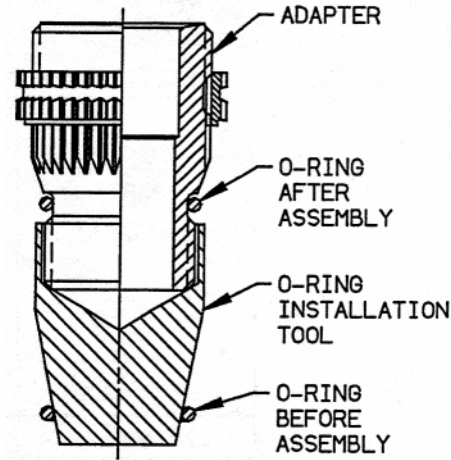


FIGURE 1

ADAPTER INSTALLATION

4. Lubricate the internal surfaces of the port and the entire adapter assembly using the same fluid or lubricant as in paragraph 2. Scratches, nicks, or rough spots are not allowed in the O-ring contact areas of the adapter or port.
5. Insert the port end of the adapter into the port by hand rotating in a clockwise direction until the adapter is seated. To avoid damaging the O-ring the adapter should not be rotated in a counterclockwise direction.

TABLE IX - INSTALLATION AND REMOVAL TOOLS

| TUBING OD | ADAPTER PART NUMBER | PORT DASH NO. PS10047 MA2110 EN2602 | O-RING NUMBER | INSTALLATION TORQUE N*m | |
|-----------|---------------------|--|---------------|----------------------------|-------|
| | | | | MIN | MAX |
| 5.0 | 7017-490610-05 | -077 | A0045 | 5.0 | 6.0 |
| 6.0 | 7017-490810-06 | -098 | A0060 | 9.0 | 12.0 |
| 8.0 | 7017-491010-08 | -125 | A0080 | 20.0 | 24.0 |
| 10.0 | 7017-491212-10 | -136 | A0095 | 34.0 | 40.0 |
| 12.0 | 7017-491415-12 | -153 | A0112 | 48.0 | 56.0 |
| 14.0 | 7017-491615-14 | -170 | A0132 | 58.0 | 66.5 |
| 16.0 | 7017-491815-16 | -192 | A0150 | 69.0 | 78.0 |
| 18.0 | 7017-492015-18 | -214 | A0170 | 82.0 | 91.5 |
| 20.0 | 7017-492215-20 | -231 | A0190 | 98.0 | 108.0 |
| 22.0 | 7017-492415-22 | -253 | A0212 | 106.0 | 117.0 |
| 25.0 | 7017-492715-25 | -295 | A0236 | 120.0 | 132.0 |
| 28.0 | 7017-493015-28 | -320 | A0265 | 137.0 | 152.0 |
| 32.0 | 7017-493315-32 | -350 | A0300 | 159.0 | 177.0 |

**INSTALLATION AND REMOVAL
7017-490000-00 SERIES**

6. Using the applicable combination wrench and drive tool on page 8, engage the serrations of the tool with the external serrations of the lockring per Figure 2. Place a torque wrench over the hex of the wrench and apply a torque equal to the minimum value specified in Table IX, page 10. Note the relationship of the lockring serrations with respect to the prebroached port serrations. If they are aligned, proceed to 7. If not, continue to slowly torque the adapter toward the maximum value allowed in TABLE IX until both serrations are aligned. This procedure normally results in the adapter being rotated 3-8. DO NOT EXCEED THE MAXIMUM TORQUE VALUES.

(NOTE: WHEN USING SPARATE WRENCH AND DRIVE TOOL, SEE ALTERNATE INSTALLATION PROCEDURE ON PAGE 13.)

7. Degrease and apply sufficient zinc chromate primer (TT-P-1757) with a brush or small syringe to the serrated area of the port so that primer will be extruded out between the lockring external serrations and port serrations when the lockring is installed. NOTE: Using design activity may specify another primer in place of, or in addition to, zinc chromate.

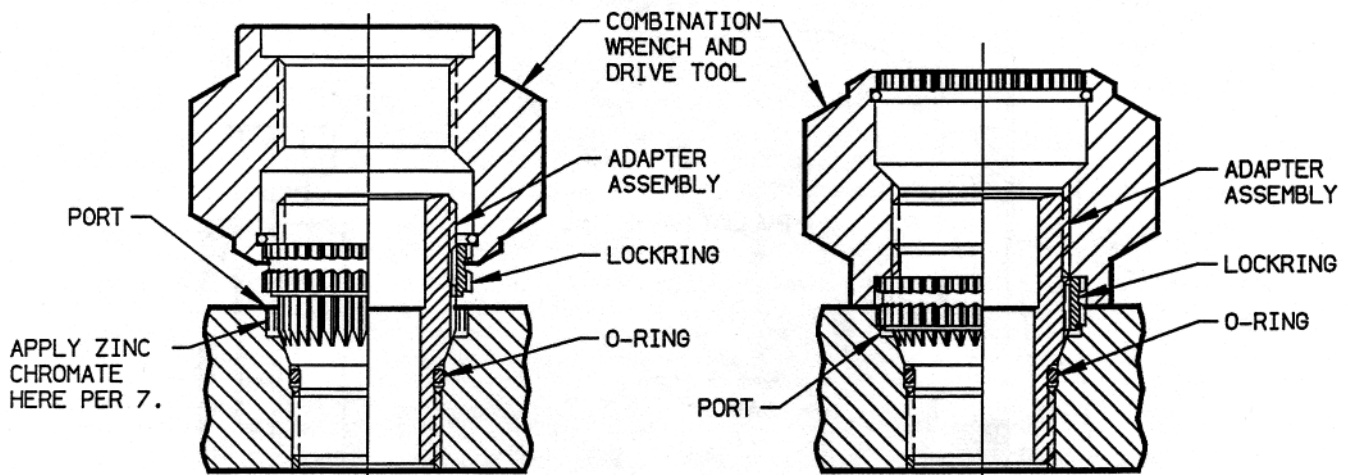


FIGURE 2
TORQUING ADAPTER

FIGURE 3
LOCKRING INSTALLATION

8. While the zinc chromate or sealant applied per 7 is still wet, install the lockring by rotating the threaded end of the tool clockwise onto the adapter until it touches the lockring. Using a wrench, turn the tool in a clockwise direction until it bottoms on the boss surface as shown in Figure 3. Visually observe that the tool has bottomed. (DO NOT OVER TORQUE - PORT DAMAGE CAN RESULT.)

CAUTION: Any sudden increase in torque prior to bottoming may indicate that the locking serrations and port serrations are not aligned. If this occurs, remove wrench and drive tool by turning counterclockwise. Lift the lockring (per paragraphs 11, 12, and 13, page 12). Torque adapter clockwise per paragraph 6 until serrations in port and external serrations of lockring are aligned. Repeat lockring installation procedure. Remove excess sealant from surface of boss and lockring.

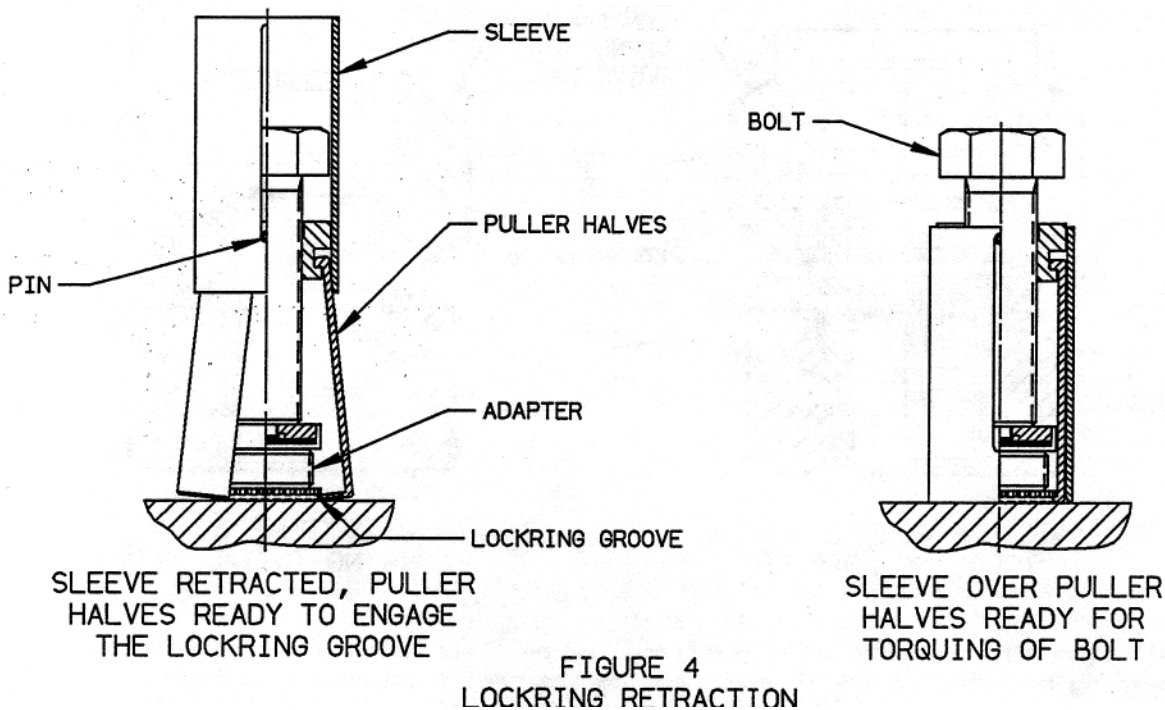
INSTALLATION AND REMOVAL 7017-490000-00 SERIES (CONTD)

PRESSURE TESTING

9. A proof pressure test may be conducted at this point. Install a pressure cap on the adapter. Pressurize the system at a pressure equal to 1.5 times the operating pressure, hold for 3 minutes. There shall be no evidence of leakage.
NOTE: Using design activity may require alternate testing.

ADAPTER REMOVAL

10. If a sealant has been used to cover lockring, carefully remove sealant to expose lockring.
11. Select the applicable size lockring removal tool from TABLE VII, page 8.
12. Spread the puller halves apart by retracting the sleeve from the tool until the pin bottoms in the groove of the sleeve per Figure 4. Holding the puller halves apart, place tool over protruding adapter. Release the puller halves and locate in the groove of the lockring. Adjustments up or down is achieved by turning the bolt head. Slide the sleeve over the puller halves and check for proper alignment of the puller halves in the lockring groove.



13. Place a wrench on the bolt head of the removal tool and turn in a clockwise direction while holding the sleeve with the other hand until the lockring is jacked out of the boss. Remove the tool from the adapter by loosening the bolt and lifting the sleeve to disengage the puller halves from the lockring groove.
14. Select the applicable combination wrench and drive tool from TABLE VII, page 8. Place tool over adapter making sure that the tool serrations are engaged with the external lockring serrations. Using a wrench, turn tool in a counterclockwise direction to remove the adapter from the boss port. Plug the port thread minor diameter when cleaning out the port cavity to avoid contamination of the system.

**INSTALLATION AND REMOVAL
7017-490000-00 SERIES**

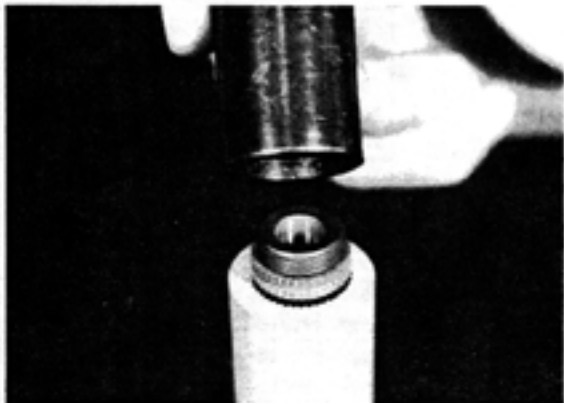
A. Install O-ring and lubricate port per paragraphs 1 thru 5 (page 10).

B. Using the applicable RFM828()W wrench in place of RFM()-()DW combination wrench and drive tool, install adapter per paragraph 6 (page 11).

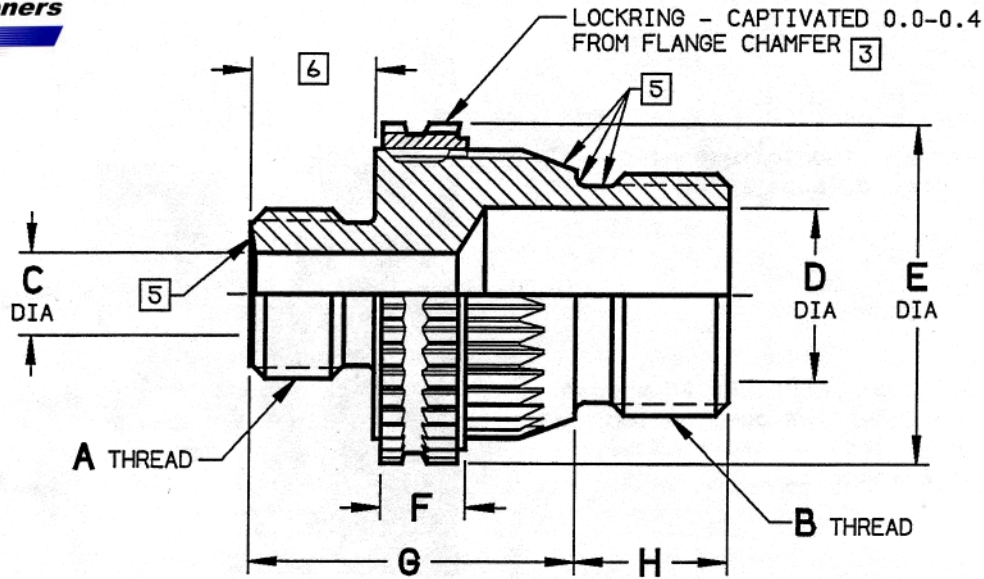
C. Prior to installing lockring, brush zinc chromate into port cavity and around top of boss per paragraph 7 (page 11).

D. To install the lockring, place the applicable RFM6828-()D tool over the adapter until it touches the lockring surface. A hammer, arbor or hydraulic press may be used to press the lockring into the boss. Installation is complete when the tool contacts the surface of the boss.

NOTE:
All check valves, quick disconnects and other special adapters must use the RFM6828-()W and RFM6828-()D tools for installation.



**ALTERNATE INSTALLATION PROCEDURE
WHEN USING SEPARATE WRENCH AND
DRIVE TOOL
7017-490000-00**



PART NUMBER CODING: 7027-49 0810-05

ROSAN BEAM SEAL, REDUCER, METRIC

MATERIAL AND FINISH [1] [2]

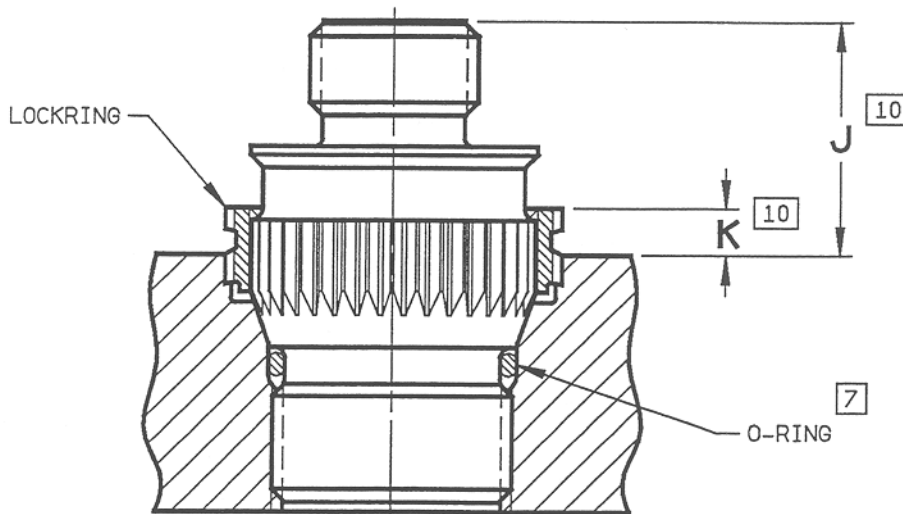
TUBE END SIZE

ROSAN PORT END THREAD SIZE, (MJ8 X 1)

| ADAPTER PART NUMBER | A THREAD MA1370 -4g6g | B THREAD MA1370 -4h6h | C DIA | D DIA +0.20 | E DIA ±0.09 | F ±0.20 | G ±0.2 | H +0.50 0 |
|--|---|--------------------------------|---|-------------------|-------------------|------------|------------------------------|-----------------|
| 7027-490810-05 | MJ10 X 1 | MJ8 X 1 | 4.20- 4.40 | 4.40 | 14.75 | 6.10 | 22.0 | 8.60 |
| 7027-491010-05 7027-491010-06 | MJ10 X 1 MJ12 X 1.25 | MJ10 X 1 | 4.20- 4.40 5.00- 5.20 | 6.10 | 17.80 | 7.00 | 23.7 25.2 | 9.30 |
| 7027-491212-06 7027-491212-08 | MJ12 X 1.25 MJ14 X 1.5 | MJ12 X 1.25 | 5.00- 5.20 6.70- 6.90 | 7.70 | 19.50 | 7.00 | 25.2 27.0 | 10.00 |
| 7027-491415-06 7027-491415-08 7027-491415-10 | MJ12 X 1.23 MJ14 X 1.5 MJ16 X 1.5 | MJ14 X 1.5 | 5.00- 5.20 6.70- 6.90 8.70- 8.90 | 9.00 | 21.00 | 7.00 | 25.2 27.0 27.0 | 10.65 |
| 7027-491615-06 7027-491615-08 7027-491615-10 7027-491615-12 | MJ12 X 1.25 MJ14 X 1.5 MJ16 X 1.5 MJ18 X 1.5 | MJ16 X 1.5 | 5.00- 5.20 6.70- 6.90 8.70- 8.90 10.60-10.80 | 10.70 | 22.60 | 7.00 | 25.2 27.0 27.0 27.0 | 11.30 |
| 7027-491815-12 7027-491815-14 | MJ18 X 1.5 MJ20 X 1.5 | MJ18 X 1.5 | 10.6-10.80 11.45-11.65 | 12.50 | 26.40 | 7.00 | 27.0 27.0 | 12.00 |
| 7027-492015-14 7027-492015-16 | MJ20 X 1.5 MJ22 X 1.5 | MJ20 X 1.5 | 11.45-11.65 13.30-13.60 | 14.20 | 28.00 | 7.00 | 28.2 28.2 | 12.70 |
| 7027-492215-14 7027-492215-16 | MJ20 X 1.5 MJ22 X 1.5 | MJ22 X 1.5 | 11.45-11.65 13.30-13.60 | 15.90 | 30.20 | 7.00 | 28.2 28.2 | 13.35 |
| 7027-492415-16 7027-492415-21 | MJ22 X 1.5 MJ24 X 1.5 | MJ24 X 1.5 | 13.30-13.60 15.30-15.60 | 17.65 | 33.70 | 7.00 | 28.2 28.2 | 14.00 |
| 7027-492715-22 | MJ30 X 1.5 | MJ27 X 1.5 | 20.80-21.10 | 20.20 | 37.00 | 7.00 | 28.5 | 15.05 |
| 7027-493015-25 | MJ33 X 1.5 | MJ30 X 1.5 | 22.40-22.70 | 22.80 | 40.70 | 7.00 | 28.5 | 16.05 |
| 7027-493315-28 | MJ36 X 1.5 | MJ33 X 1.5 | 25.60-25.90 | 25.40 | 43.00 | 7.00 | 28.5 | 17.05 |

**ADAPTER -REDUCER
BEAM SEAL (EN2604)
28000KPa, METRIC**

**7027-490000-00
SERIES**



7027-490000-00 ADAPTER - REDUCER
INSTALLED IN ROSAN PS10047 (MA2110 - EN2602) PORT

| ADAPTER PART NUMBER REF | O-RING NUMBER REF | J ± 0.50 | K MAX |
|--|-------------------|----------------------------------|----------|
| 7027-490810-05 | A0060 | 15.85 | 3.65 |
| 7027-491010-05 7027-491010-06 | A0080 | 17.00 18.50 | 4.10 |
| 7027-491212-06 7027-491212-08 | A0095 | 18.50 20.30 | 4.10 |
| 7027-491415-06 7027-491415-08 7027-491415-10 | A0112 | 18.55 20.35 20.35 | 4.10 |
| 7027-491615-06 7027-491615-08 7027-491615-10 7027-491615-12 | A0132 | 18.55 20.35 20.35 20.35 | 4.10 |
| 7027-491815-12 7027-491815-14 | A0150 | 20.30 20.30 | 4.10 |
| 7027-492015-14 7027-492015-16 | A0170 | 20.50 20.50 | 4.10 |
| 7027-492215-14 7027-492215-16 | A0190 | 20.50 20.50 | 4.10 |
| 7027-492415-16 7027-492415-18 | A0212 | 20.50 20.50 | 4.10 |
| 7027-492715-22 | A0236 | 20.85 | 4.10 |
| 7027-493015-25 | A0265 | 20.85 | 4.10 |
| 7027-493315-28 | A0300 | 20.85 | 4.10 |

NOTES: UNLESS OTHERWISE SPECIFIED

- 1 MATERIAL: ADAPTER: 6A1-4V titanium per AMS-4928 or AMS-4967, 900 MPa UTS min.
LOCKRING: A286 corrosion resistant steel per AMS-5731 or AMS-5734, 34-40 HRC.
- 2 FINISH: ADAPTER: Dry film lubricant per MIL-L-46010, Type I, on all surfaces except flow hole and lockring.
LOCKRING: Passivate per QQ-P-35.
- 3 Lockring retained on adapter by controlled interference fit. One tooth removed from external serration for identification purposes.
4. All interior packages are marked per MIL-STD-129 and durably marked with the complete Rosan part number.
- 5 Sealing surface: No visible defects.
To be protected for shipment.
- 6 This end per AECMA standard EN2604.
- 7 O-rings must be specified separately and shall be selected based on system fluid and temperature and are not supplied by Rosan.
8. These adapters are installed in Rosan ports per PS10047, page 6.
9. Refer to page 16 for installation procedure.
- 10 Stand-off dimensions are for design purposes only. Do not use as installation data.

**ADAPTER -REDUCER
BEAM SEAL (EN2604)
28000KPa, METRIC**

**7027-490000-00
SERIES**

TABLE X

| ADAPTER PART NUMBER | PORT DASH NO. PS10047 MA2110 EN2602 | PORTING TOOL | BROACH TOOL | O-RING INSTL TOOL | WRENCH | LOCKING DRIVE TOOL | LOCKRING REMOVAL TOOL |
|--|--|--------------|-------------|-------------------|--------------|--------------------|-----------------------|
| 7027-490810-05 | -098 | RPTM098 | RFMOPB098 | ORTM0810 | RFM6828-098W | RFM6828-098D | RFM098LPDE |
| 7027-490810-05 7027-491010-06 | -125 | RPTM125 | RFMOPB125 | ORTM1010 | RFM6828-125W | RFM6828-125D | RFM125LPDE |
| 7027-491212-06 7027-491212-08 | -136 | RPTM136 | RFMOPB136 | ORTM1212 | RFM6828-136W | RFM6828-136D | RFM136LPDE |
| 7027-491415-06 7027-491415-08 7027-491415-10 | -153 | RPTM153 | RFMOPB153 | ORTM1415 | RFM6828-153W | RFM6828-153D | RFM153LPDE |
| 7027-491615-06 7027-491615-08 7027-491615-10 7027-491615-12 | -170 | RPTM170 | RFMOPB170 | ORTM1615 | RFM6828-170W | RFM6828-170D | RFM170LPDE |
| 7027-491815-12 7027-491815-14 | -192 | RPTM192 | RFMOPB192 | ORTM1815 | RFM6828-192W | RFM6828-192D | RFM192LPDE |
| 7027-492015-14 7027-492015-16 | -214 | RPTM214 | RFMOPB214 | ORTM2015 | RFM6828-214W | RFM6828-214D | RFM214LPDE |
| 7027-492215-14 7027-492215-16 | -231 | RPTM231 | RFMOPB231 | ORTM2215 | RFM6828-231W | RFM6828-231D | RFM231LPDE |
| 7027-492415-16 7027-492415-18 | -253 | RPTM253 | RFMOPB253 | ORTM2415 | RFM6828-253W | RFM6828-253D | RFM253LPDE |
| 7027-492715-22 | -295 | RPTM295 | RFMOPB295 | ORTM2715 | RFM6828-295W | RFM6828-295D | RFM295LPDE |
| 7027-493015-25 | -320 | RPTM320 | RFMOPB320 | ORTM3015 | RFM6828-320W | RFM6828-320D | RFM320LPDE |
| 7027-493315-28 | -350 | RPTM350 | RFMOPB350 | ORTM3315 | RFM6828-350W | RFM6828-350D | RFM350LPDE |

PORT PREPARATION

1. Prepare boss and port per PS10047, pages 6 and 7.
Drill thru or to depth specified on application drawing. Use a drill with a diameter 0.4-0.7 smaller than the thread minor diameter specified in standard PS10047. This will allow the Rosan RPTM porting tool to finish the thread minor diameter to the size required for piloting the broach tool.

O-RING INSTALLATION

2. Install O-ring on the adapter per paragraphs 2 and 3, page 10.

ADAPTER INSTALLATION

3. Lubricate the port and adapter per paragraph 4, page 10.
4. Insert the adapter into the port by hand per paragraph 5, page 10.
5. Using the applicable wrench shown in TABLE X, engage the serrations of the tool with the external serrations of the lockring. Place a torque wrench over the hex of the wrench and apply a torque equal to the minimum value specified in TABLE XI. Note the relationship of the lockring serrations with respect to the prebroached port serrations. If they are aligned, proceed to 6. If not, continue to slowly torque the adapter toward the maximum value allowed in TABLE XI until both serrations are aligned. This procedure normally results in the adapter being rotated 3-8.
DO NOT EXCEED THE MAXIMUM TORQUE VALUES.

TOOLING, INSTALLATION AND REMOVAL 7027-490000-00 SERIES

TABLE XI

| ADAPTER PART NUMBER | O-RING NUMBER | INSTALLATION TORQUE N*m |
|--|---------------|----------------------------|
| | REF | |
| 7027-490810-05 | A0060 | 9.0- 12.0 |
| 7027-491010-05 7027-491010-06 | A0080 | 20.0- 24.0 |
| 7027-491212-06 7027-491212-08 | A0095 | 34.0- 40.0 |
| 7027-491415-06 7027-491415-08 7027-491415-10 | A0112 | 48.0- 56.0 |
| 7027-491615-06 7027-491615-08 7027-491615-10 7027-491615-12 | A0132 | 58.0- 66.5 |
| 7027-491815-12 7027-491815-14 | A0150 | 69.0- 78.0 |
| 7027-492015-14 7027-492015-16 | A0170 | 82.0- 91.5 |
| 7027-492215-14 7027-492215-16 | A0190 | 98.0-108.0 |
| 7027-492415-16 7027-492415-18 | A0212 | 106.0-117.0 |
| 7027-492715-22 | A0236 | 120.0-132.0 |
| 7027-493015-25 | A0265 | 137.0-152.0 |
| 7027-493315-28 | A0300 | 159.0-177.0 |



- Degrease and apply sufficient zinc chromate primer with a brush or small syringe to the serrated area of the part so that the primer will extrude out between the locking external serrations and port serrations when the locking is installed.
NOTE: Using design activity may specify another primer, in place of or in addition to, zinc chromate.
- While the zinc chromate or sealant applied per 6 is still wet, install the locking by placing the applicable size RFM6828()D drive tool over the tube end of the adapter. The drive tool is positioned when it is seated on the top surface of the locking. A hammer, arbor or hydraulic press may be used to press the locking into the boss. Installation is complete when the tool contacts the surface of the boss.

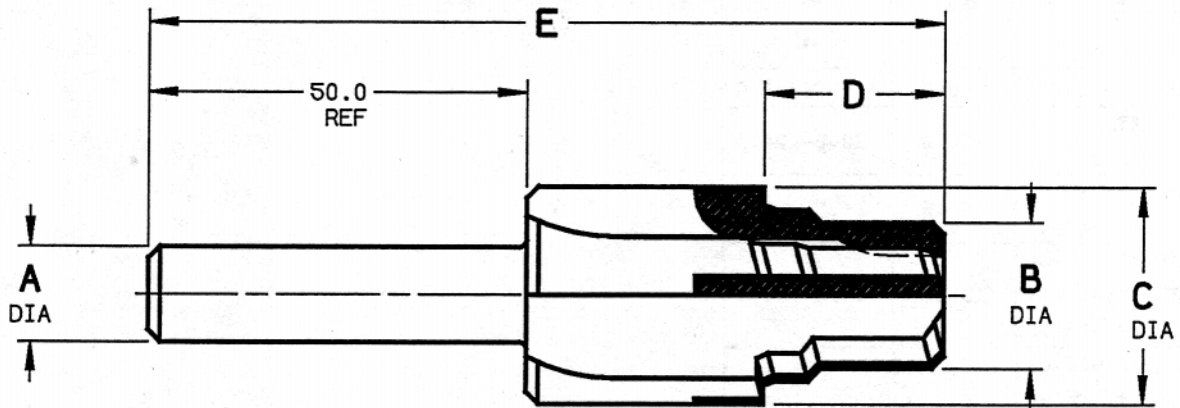
PRESSURE TESING

- See paragraph 9, page 12.

ADAPTER REMOVAL

- Proceed per paragraphs 10 thru 14, page 12, except paragraph 14, use wrench series RFM6828()W.

**INSTALLATION AND REMOVAL
7027-490000-00 SERIES (CONTD)**



| PORTING TOOL NUMBER | PORT DASH NO. | A DIA | B DIA | C DIA | D | E | PORT THREAD MA1370 -4H5H REF |
|---------------------|-----------------------------|-------------|-------------|-------------|-------|-------|---------------------------------------|
| | PS10047 MA2110 EN2602 | 0 -0.008 | 0 ±0.013 | 0 ±0.008 | ±0.15 | ±0.75 | |
| * RTPM077 | -077 | 9.995 | 5.103 | 12.030 | 16.13 | 101.6 | MJ6 X 1 |
| RPTM098 | -098 | 9.995 | 7.103 | 14.040 | 16.93 | 86.8 | MJ8 X 1 |
| RPTM125 | -125 | 9.995 | 9.103 | 17.060 | 17.68 | 87.5 | MJ8 X 1 |
| RPTM136 | -136 | 14.995 | 10.860 | 18.660 | 18.38 | 88.2 | MJ12 X 1.25 |
| RPTM153 | -153 | 14.995 | 12.614 | 20.240 | 19.03 | 94.6 | MJ14 X 1.5 |
| RPTM170 | -170 | 14.995 | 14.614 | 21.840 | 19.68 | 95.9 | MJ16 X 1.5 |
| RPTM192 | -192 | 14.995 | 16.614 | 25.420 | 21.09 | 97.3 | MJ18 X 1.5 |
| RPTM214 | -214 | 14.995 | 18.614 | 27.070 | 22.79 | 105.3 | MJ20 X 1.5 |
| RPTM231 | -231 | 24.995 | 20.614 | 29.380 | 23.49 | 106.0 | MJ22 X 1.5 |
| RPTM253 | -253 | 24.995 | 22.614 | 32.560 | 25.67 | 108.2 | MJ24 X 1.5 |
| RPTM295 | -295 | 24.995 | 25.614 | 36.060 | 26.72 | 109.3 | MJ27 X 1.5 |
| RPTM320 | -320 | 24.995 | 28.614 | 39.690 | 27.72 | 116.6 | MJ30 X 1.5 |
| RPTM350 | -350 | 24.995 | 31.614 | 42.080 | 28.72 | 117.6 | MJ33 X 1.5 |

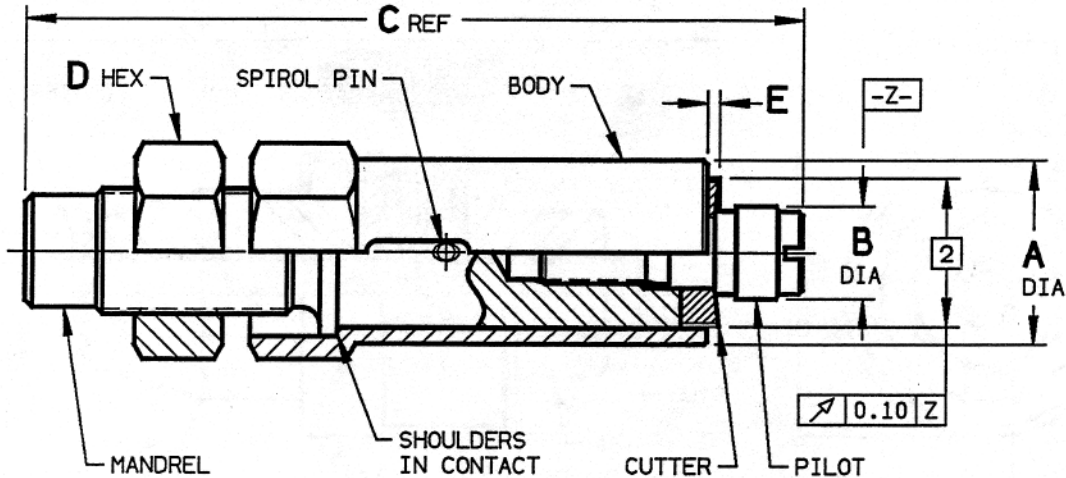
* SOLID CARBIDE

APPLICATION:

This tool counterbores, countersinks, provides a radius and produces a tap drill diameter in one pass. Contours are ground to insure concentricity. Cutter geometry and material permit the use of this tool with most common materials.

**PORTING TOOL
CARBIDE TIPPED
PS10047 (MA2110-EN2602) PORT**

**RPTM()
SERIES**



| BROACH TOOL NUMBER | PORT DASH NO. PS10047 MA2110 EN2602 | A DIA ±0.4 | B DIA REF | C REF | D HEX REF | E ±0.40 0 | CUTTER NUMBER 1 |
|--------------------|--|------------------|-----------------|----------|-----------------|-----------------|--------------------|
| RFMOPB077 | -077 | 21.3 | 5.04 | 136.0 | 22.0 | 1.95 | RFMOPB077-3 |
| RFMOPB098 | -098 | 21.3 | 7.04 | 137.3 | 22.0 | 2.35 | RFMOPB098-3 |
| RFMOPB125 | -125 | 23.3 | 9.04 | 140.6 | 24.0 | 2.75 | RFMOPB125-3 |
| RFMOPB136 | -136 | 26.3 | 10.80 | 140.9 | 27.0 | 2.75 | RFMOPB136-3 |
| RFMOPB153 | -153 | 29.3 | 12.55 | 140.9 | 30.0 | 2.75 | RFMOPB153-3 |
| RFMOPB170 | -170 | 29.3 | 14.55 | 141.6 | 30.0 | 2.75 | RFMOPB170-3 |
| RFMOPB192 | -192 | 35.2 | 16.55 | 142.1 | 36.0 | 2.75 | RFMOPB192-3 |
| RFMOPB214 | -214 | 35.2 | 18.55 | 142.4 | 36.0 | 2.75 | RFMOPB214-3 |
| RFMOPB231 | -231 | 40.2 | 20.55 | 143.4 | 41.0 | 2.75 | RFMOPB231-3 |
| RFMOPB253 | -253 | 40.2 | 22.55 | 143.4 | 41.0 | 2.75 | RFMOPB253-3 |
| RFMOPB295 | -295 | 45.2 | 25.55 | 143.4 | 46.0 | 2.75 | RFMOPB295-3 |
| RFMOPB320 | -320 | 49.2 | 28.55 | 143.4 | 50.0 | 2.75 | RFMOPB320-35 |
| RFMOPB350 | -350 | 54.2 | 31.55 | 143.4 | 55.0 | 2.75 | RFMOPB350-3 |

NOTES: UNLESS OTHERWISE SPECIFIED

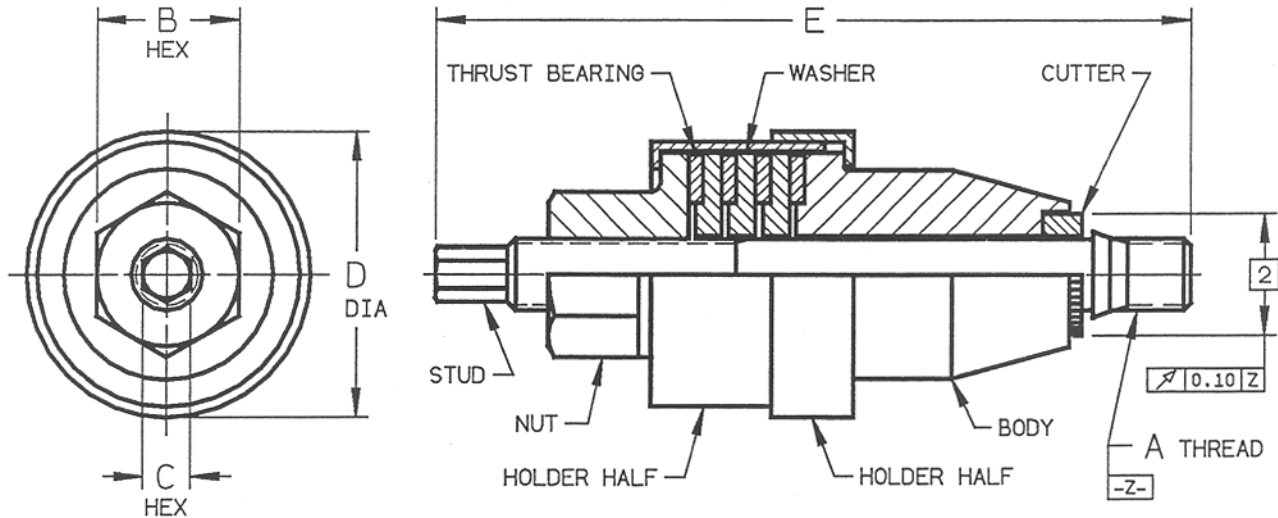
- 1 Replacement or spare cutters may be purchased individually.
- 2 Noted runout and the controlled minor diameter of the PS10047 port will result in a permissible maximum runout of 0.23 between the serration major diameter and the controlled thread minor diameter after broaching.

APPLICATION: This broach tool is designed to produce serrations in the counterbore of PS10047 ports. The tool will broach into aluminum, magnesium and materials with a maximum hardness of 32 HRC.

METHOD: Insert the pilot into the tap drill hole of the port and apply sufficient force to the top of the mandrel to allow the cutter to broach the required serrations. When the external shoulder of the mandrel contracts the internal shoulder of the body, broaching is complete. If the cutter is stuck in the counterbore, turn the nut in a clockwise direction to extract the cutter. CAUTION: The nut is for cutter extraction only and is not a stop, insure that the nut does not contract the tool body during broaching.

**BROACH TOOL - IMPACT TYPE
PS10047 (MA2110-EN2602)
PORT SERRATIONS**

**RPMOPB()
SERIES**



| BROACH TOOL NUMBER | PORT DASH NO. PS10047 MA2110 EN2602 | A | B | C | D | E | THRUST BEARING | | CUTTER NUMBER |
|--------------------|--|-------------------------------|----------------|----------------|-----------------------|---------------|----------------|-----|----------------|
| | | THREAD MA1370 -4h6h | HEX REF | HEX REF | DIA MAX REF | ±0.75 | 3 | | |
| | | | | | | | PART NO | QTY | 1 |
| RFMOPB077HDB | -077 | MJ6 X 1 | 10.0 | 4.0 | 25.0 | 78.20 | NTA-512 | 4 | RFMOPB077-HDB5 |
| RFMOPB098HDB | -098 | MJ8 X 1 | 13.0 | 5.5 | 27.5 | 85.70 | NTA-613 | 4 | RFMOPB098-HDB5 |
| RFMOPB125HDB | -125 | MJ10 X 1 | 17.0 | 7.0 | 31.0 | 98.80 | NTA-815 | 4 | RFMOPB125-HDB5 |
| RFMOPB136HDB | -136 | MJ12 X 1.25 | 19.0 | 8.0 | 34.0 | 104.30 | NTA-916 | 4 | RFMOPB136-HDB5 |
| RFMOPB153HDB | -153 | MJ14 X 1.5 | 22.0 | 10.0 | 38.0 | 113.65 | NTA-1018 | 4 | RFMOPB153-HDB5 |
| RFMOPB170HDB | -170 | MJ16 X 1.5 | 24.0 | 12.0 | 40.7 | 127.70 | NTA-1220 | 4 | RFMOPB170-HDB5 |
| RFMOPB192HDB | -192 | MJ18 X 1.5 | 27.0 | 13.0 | 45.0 | 131.70 | NTA-1423 | 3 | RFMOPB192-HDB5 |
| RFMOPB214HDB | -214 | MJ20 X 1.5 | 30.0 | 15.0 | 49.0 | 142.40 | FTA-2542 | 3 | RFMOPB214-HDB5 |
| RFMOPB231HDB | -231 | MJ22 X 1.5 | 32.0 | 17.0 | 51.3 | 147.15 | NTA-1625 | 3 | RFMOPB231-HDB5 |
| RFMOPB253HDB | -253 | MJ24 X 1.5 | 36.0 | 19.0 | 57.0 | 164.40 | NTA-1828 | 3 | RFMOPB253-HDB5 |
| RFMOPB295HDB | -295 | MJ27 X 1.5 | 41.0 | 20.0 | 62.7 | 177.65 | NTA-2031 | 3 | RFMOPB295-HDB5 |
| RFMOPB320HDB | -320 | MJ30 X 1.5 | 46.0 | 24.0 | 69.3 | 191.00 | FTA-3552 | 3 | RFMOPB320-HDB5 |
| RFMOPB350HDB | -350 | MJ33 X 1.5 | 50.0 | 25.0 | 75.0 | 206.15 | NTA-2435 | 3 | RFMOPB350-HDB5 |

NOTES: UNLESS OTHERWISE SPECIFIED

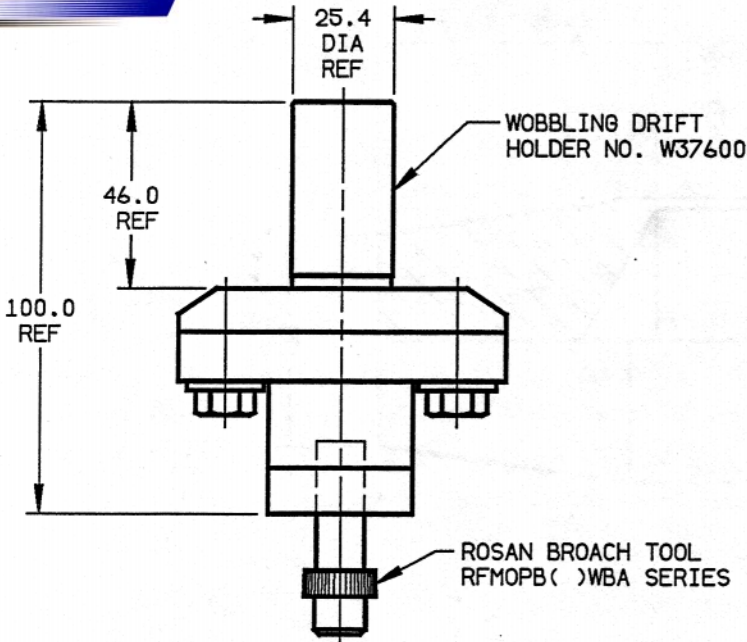
- 1 Two extra cutters are provided with each tool. Replacement or spare cutters may be purchased individually.
- 2 Noted runout and the controlled minor diameter of the port will result in a permissible maximum runout of 0.23 between the serration major diameter and the controlled thread minor diameter after broaching.
- 3 Bearings manufactured by The Torrington Company, CT, USA.

APPLICATION: This broach tool is designed to produce serrations in the counterbore of PS10047 ports. The tool will broach into aluminum, magnesium and other materials with a maximum hardness of 40 HRC.

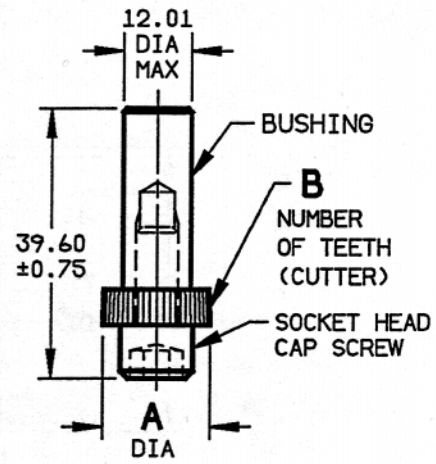
METHOD: Screw the "A" thread end of the stud into the threaded hole of the port until the stud is seated against the 20° taper in the port. Turn the hex nut in a clockwise direction to broach serrations. Broaching is complete when the tool body contacts the port surface. Using hex at end of the stud turn stud in a counterclockwise direction to retract cutter from port.

**BROACH TOOL, NON-IMPACT TYPE
PS10047 (MA2110-EN2602)
PORT SERRATIONS**

**RPMOPB()HDB
SERIES**



WOBBLE BROACH ASSEMBLY



ROSAN BROACH TOOL



CUTTER AND SCREW COMBINATION ¹

| BROACH TOOL NUMBER | PORT DASH NO. PS10047 MA2110 EN2602 | A | B | CUTTER AND SCREW COMBINATION NUMBER ¹ |
|--------------------|--|---------|-----------------|---|
| | | DIA REF | NUMBER OF TEETH | |
| RFMOPB077WBA | -077 | 13.13 | 23 | RFMOPB077WBA23 |
| RFMOPB098WBA | -098 | 15.01 | 27 | RFMOPB098WBA23 |
| RFMOPB125WBA | -125 | 18.08 | 31 | RFMOPB125WBA23 |
| RFMOPB136WBA | -136 | 19.76 | 40 | RFMOPB136WBA23 |
| RFMOPB153WBA | -153 | 21.26 | 38 | RFMOPB153WBA23 |
| RFMOPB170WBA | -170 | 22.86 | 40 | RFMOPB170WBA23 |
| RFMOPB192WBA | -192 | 26.80 | 38 | RFMOPB192WBA23 |
| RFMOPB214WBA | -214 | 28.30 | 43 | RFMOPB214WBA23 |
| RFMOPB231WBA | -231 | 30.45 | 46 | RFMOPB231WBA23 |
| RFMOPB253WBA | -253 | 33.99 | 36 | RFMOPB253WBA23 |
| RFMOPB295WBA | -295 | 37.31 | 47 | RFMOPB295WBA23 |
| RFMOPB320WBA | -320 | 41.22 | 32 | RFMOPB320WBA23 |
| RFMOPB350WBA | -350 | 43.31 | 53 | RFMOPB350WBA23 |

NOTES: UNLESS OTHERWISE SPECIFIED

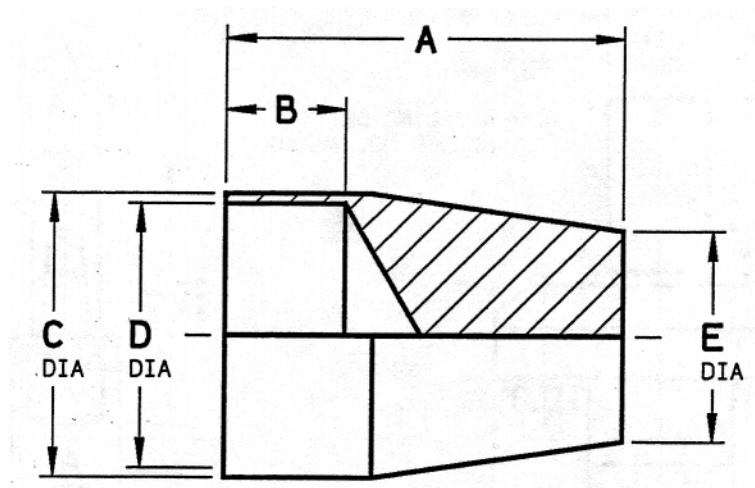
- ¹ Replacement or spare Cutter and Screw Combinations may be purchased individually.
2. After broaching, a maximum runout of 0.23 is permissible between the serration major diameter and the controlled minor diameter of the port thread.

APPLICATION: This broach tool is designed to produce serrations in the counterbore of PS10047 ports. The tool will broach into aluminum, magnesium and materials with a maximum hardness of 40 HRC.

METHOD: This tool is used in conjunction with a Wobbling Drift Holder, a product of The Wickrman Corp., 10325 Capital Ave., Oak Park, MI USA or Index-Werke Kg, Hahn and Tessky, 73 Esslingen, P.O. Box 809, Germany.

BROACH TOOL - WOBBLE TYPE
PS10047 (MA2110-EN2602)
PORT SERRATIONS

RFMOPB()WBA
SERIES



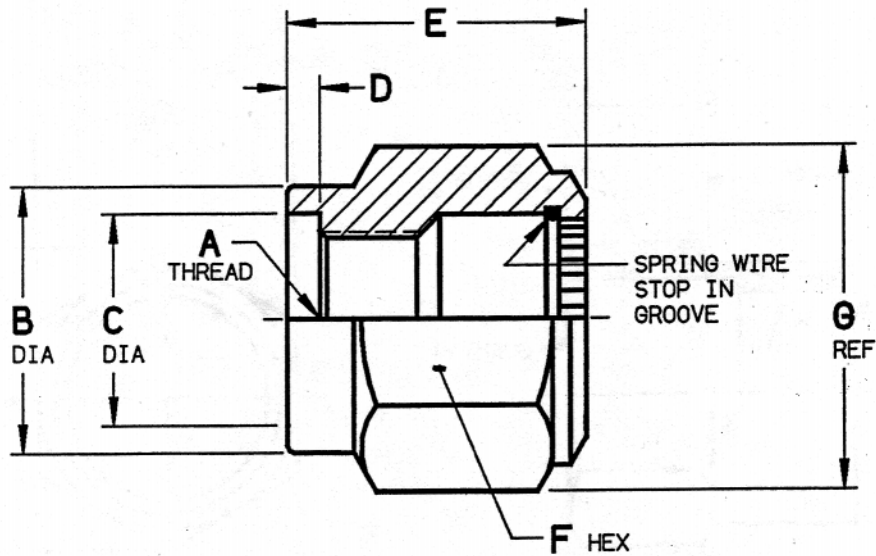
| O-RING INSTALLATION TOOL NUMBER | A | B | C DIA | D DIA | E DIA |
|--|------|----------------|----------|----------|----------|
| | ±1.5 | +1.25 -0.25 | MAX | MIN | ±1.00 |
| ORTM0610 | 19.0 | 5.60 | 7.80 | 6.05 | 3.25 |
| ORTM0810 | 21.0 | 6.10 | 9.80 | 8.05 | 4.70 |
| ORTM1010 | 22.0 | 6.85 | 11.80 | 10.05 | 6.70 |
| ORTM1212 | 24.5 | 7.60 | 13.80 | 12.05 | 8.10 |
| ORTM1415 | 25.5 | 8.15 | 15.80 | 14.05 | 9.80 |
| ORTM1615 | 26.5 | 8.90 | 17.80 | 16.05 | 11.75 |
| ORTM1815 | 28.5 | 9.40 | 19.80 | 18.05 | 13.30 |
| ORTM2015 | 29.5 | 10.15 | 21.90 | 20.05 | 15.25 |
| ORTM2215 | 30.0 | 10.90 | 23.90 | 22.05 | 17.25 |
| ORTM2415 | 30.0 | 11.45 | 25.90 | 24.05 | 19.45 |
| ORTM2715 | 33.5 | 12.45 | 29.00 | 27.05 | 21.85 |
| ORTM3015 | 35.0 | 13.45 | 32.00 | 30.05 | 24.70 |
| ORTM3315 | 34.5 | 14.50 | 35.00 | 33.05 | 28.20 |

NOTES: UNLESS OTHERWISE SPECIFIED

- MATERIAL: Teflon or Nylon

O-RING INSTALLATION TOOL

**ORTM()
SERIES**



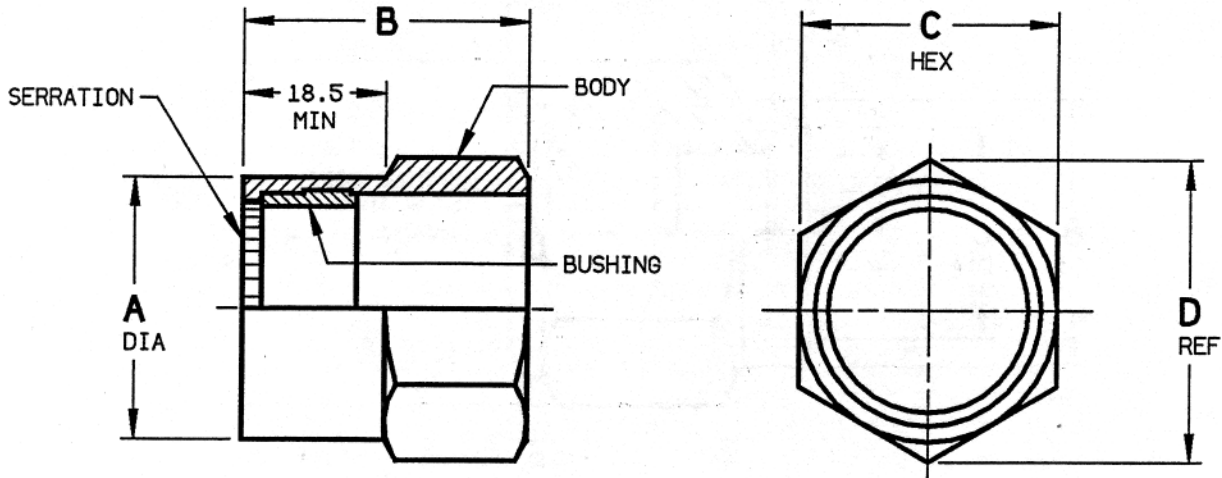
| COMBINATION WRENCH AND DRIVE TOOL | A THREAD MA1370 -4H5H | B DIA ±0.40 | C DIA ±0.25 | D +0.18 -0.05 | E ±0.40 | F HEX REF | G ACROSS CORNERS REF |
|---|--------------------------------|-------------------|-------------------|---------------------|------------|-----------------|-------------------------------|
| RFM077-1010DW | MJ10 X 1 | 19.80 | 13.35 | 3.05 | 29.50 | 22.0 | 25.4 |
| RFM098-1212DW | MJ12 X 1.25 | 21.70 | 15.20 | 3.50 | 32.50 | 24.0 | 27.7 |
| RFM125-1415DW | MJ14 X 1.5 | 24.80 | 18.25 | 3.95 | 37.10 | 27.0 | 31.2 |
| RFM136-1615DW | MJ16 X 1.5 | 26.40 | 19.95 | 3.95 | 37.10 | 30.0 | 34.6 |
| RFM153-1815DW | MJ18 X 1.5 | 27.90 | 21.45 | 3.95 | 37.10 | 30.0 | 34.6 |
| RFM170-2015DW | MJ20 X 1.5 | 29.50 | 23.05 | 3.95 | 36.60 | 32.0 | 37.0 |
| RFM192-2215DW | MJ22 X 1.5 | 33.40 | 26.90 | 3.95 | 37.60 | 36.0 | 41.6 |
| RFM214-2415DW | MJ24 X 1.5 | 35.00 | 28.50 | 3.95 | 37.60 | 41.0 | 47.3 |
| RFM231-2715DW | MJ27 X 1.5 | 37.20 | 30.65 | 3.95 | 38.10 | 41.0 | 47.3 |
| RFM253-3015DW | MJ30 X 1.5 | 40.70 | 34.20 | 3.95 | 38.10 | 46.0 | 53.1 |
| RFM295-3315DW | MJ33 X 1.5 | 44.10 | 37.60 | 3.95 | 38.10 | 46.0 | 53.1 |
| RFM320-3615DW | MJ36 X 1.5 | 48.00 | 41.50 | 3.95 | 38.10 | 50.0 | 57.7 |
| RFM350-3615DW | MJ39 X 1.5 | 50.10 | 43.60 | 3.95 | 38.10 | 55.0 | 63.5 |

NOTES: UNLESS OTHERWISE SPECIFIED

1. MATERIAL: Alloy steel.
2. FINISH: Black oxide plus oil.
3. This tool is used with 7017-490000-00 series adapters only.

COMBINATION
WRENCH AND DRIVE TOOL

RPF()-()DW
SERIES



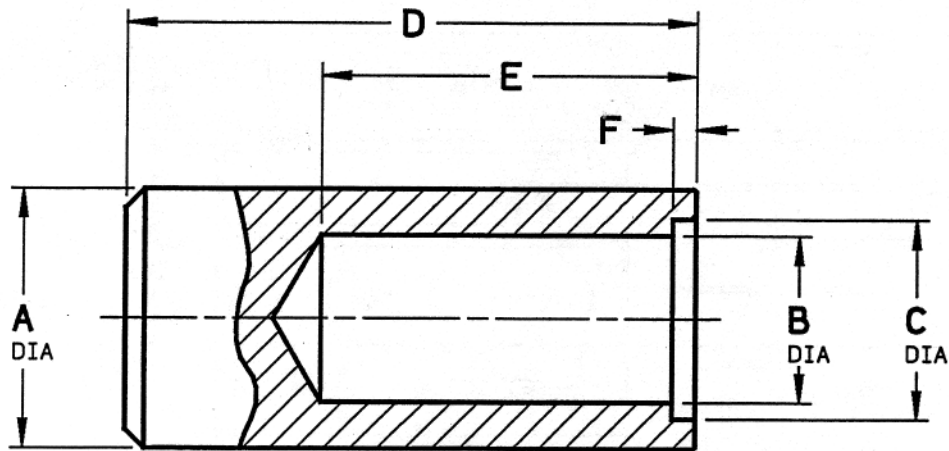
| WRENCH NUMBER | A DIA MAX | B ±0.5 | C HEX | D ACROSS CORNERS REF | SERRATION NUMBER OF TEETH |
|---------------|-----------------|-----------|----------|----------------------------|---------------------------------|
| RFM6828-077W | 18.25 | 38.1 | 18.0 | 20.8 | 23 |
| RFM6828-098W | 20.25 | 38.1 | 20.0 | 23.1 | 27 |
| RFM6828-125W | 22.25 | 38.1 | 22.0 | 25.4 | 31 |
| RFM6828-136W | 24.25 | 38.1 | 24.0 | 27.7 | 40 |
| RFM6828-153W | 25.50 | 38.1 | 25.0 | 28.9 | 38 |
| RFM6828-170W | 28.25 | 38.1 | 28.0 | 32.3 | 40 |
| RFM6828-192W | 30.25 | 38.1 | 30.0 | 34.6 | 38 |
| RFM6828-214W | 32.25 | 38.1 | 32.0 | 37.0 | 43 |
| RFM6828-231W | 36.25 | 38.1 | 36.0 | 41.6 | 46 |
| RFM6828-253W | 38.25 | 38.1 | 38.0 | 43.9 | 36 |
| RFM6828-295W | 45.25 | 38.1 | 45.0 | 52.0 | 47 |
| RFM6828-320W | 48.25 | 38.1 | 48.0 | 55.4 | 32 |
| RFM6828-350W | 50.25 | 38.1 | 50.0 | 57.7 | 53 |

NOTES: UNLESS OTHERWISE SPECIFIED

- MATERIAL: Body: Steel
Bushing: Free cutting brass or aluminum.
- FINISH: Body: Black oxide plus oil.
Bushing: None.

WRENCH

RFM6826-()W
SERIES



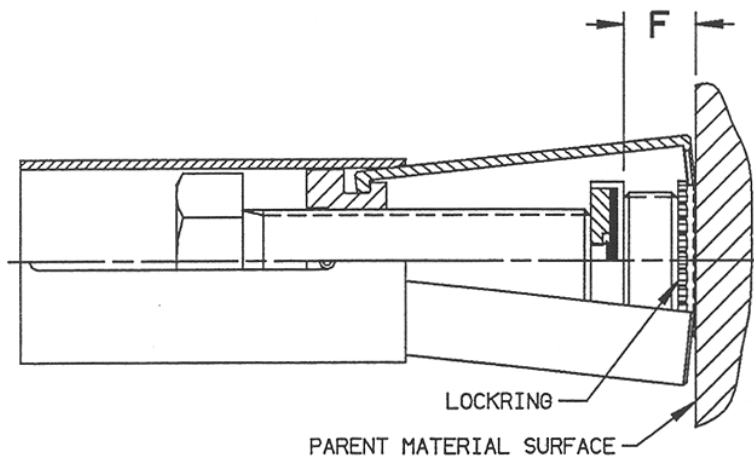
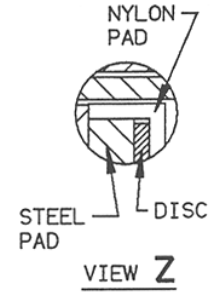
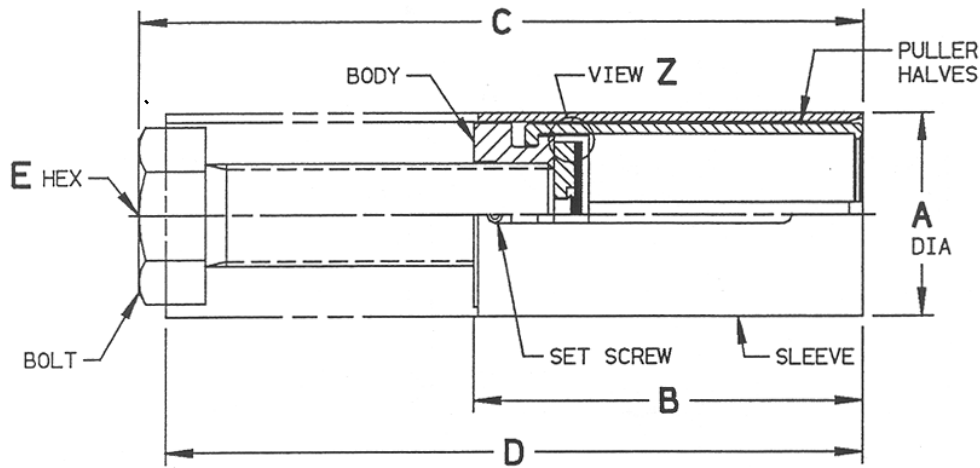
| LOCKING DRIVE TOOL | A DIA | B DIA | C DIA | D | E | F |
|--------------------------|----------------|----------------|----------|------|------|----------------|
| | +0.30 -0.55 | +0.15 -0.05 | ±0.15 | ±1.0 | MIN | +0.15 -0.05 |
| RFM6828-077D | 19.00 | 10.15 | 13.60 | 76.0 | 19.0 | 3.05 |
| RFM6828-098D | 20.60 | 12.15 | 15.45 | 76.0 | 22.0 | 3.50 |
| RFM6828-125D | 24.60 | 14.15 | 18.50 | 76.0 | 22.0 | 3.95 |
| RFM6828-136D | 25.40 | 16.15 | 20.20 | 76.0 | 22.0 | 3.95 |
| RFM6828-153D | 26.95 | 18.15 | 21.70 | 76.0 | 22.0 | 3.95 |
| RFM6828-170D | 30.20 | 20.15 | 23.30 | 76.0 | 22.0 | 3.95 |
| RFM6828-192D | 33.30 | 22.15 | 27.20 | 76.0 | 22.0 | 3.95 |
| RFM6828-214D | 34.90 | 24.15 | 28.75 | 76.0 | 22.0 | 3.95 |
| RFM6828-231D | 38.10 | 27.15 | 30.90 | 76.0 | 22.0 | 3.95 |
| RFM6828-253D | 41.30 | 30.15 | 34.50 | 76.0 | 24.0 | 3.95 |
| RFM6828-295D | 46.00 | 33.15 | 37.85 | 76.0 | 24.0 | 3.95 |
| RFM6828-320D | 50.00 | 36.15 | 41.85 | 76.0 | 24.0 | 3.95 |
| RFM6828-350D | 50.80 | 39.15 | 43.95 | 76.0 | 24.0 | 3.95 |

NOTES: UNLESS OTHERWISE SPECIFIED

1. MATERIAL: Body: Alloy Steel.
2. FINISH: Black oxide plus oil.

LOCKRING DRIVE TOOL

RFM6826-()D
SERIES

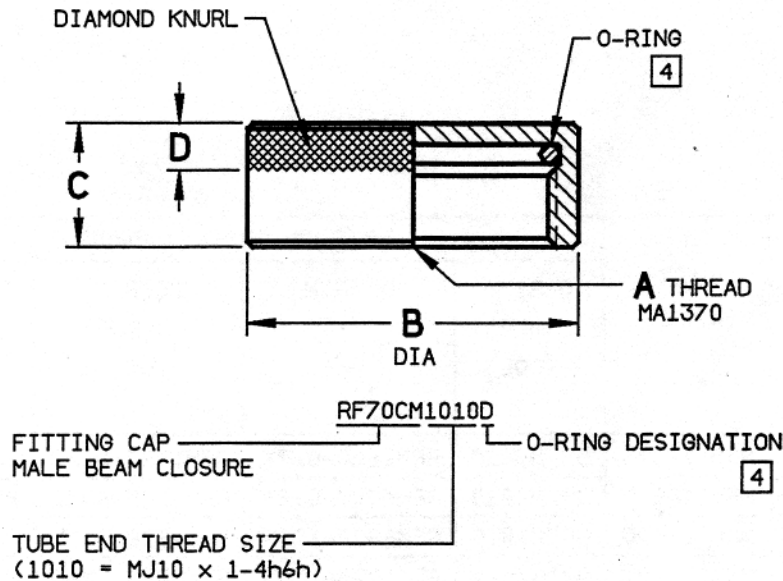


| LOCKRING REMOVAL TOOL NUMBER | A | B | C | D | E | F | |
|---------------------------------------|-------|------|-------|-------|------|-----|------|
| | DIA | | | | HEX | 1 | |
| | MAX | MAX | MAX | MAX | NOM | MIN | MAX |
| RFM077LPDE | 20.45 | 57.7 | 98.5 | 101.6 | 10.0 | 6.0 | 37.0 |
| RFM098LPDE | 22.73 | 58.0 | 100.5 | 102.8 | 13.0 | 7.0 | 37.5 |
| RFM125LPDE | 26.16 | 62.8 | 110.5 | 112.1 | 17.0 | 8.0 | 42.0 |
| RFM136LPDE | 28.07 | 66.1 | 117.5 | 118.3 | 19.0 | 8.0 | 44.0 |
| RFM153LPDE | 29.84 | 67.4 | 119.5 | 120.5 | 19.0 | 8.0 | 45.0 |
| RFM170LPDE | 31.75 | 68.8 | 122.0 | 123.6 | 19.0 | 8.0 | 46.5 |
| RFM192LPDE | 35.81 | 72.3 | 129.5 | 129.7 | 24.0 | 8.0 | 48.0 |
| RFM214LPDE | 37.72 | 74.6 | 134.0 | 134.8 | 24.0 | 8.0 | 50.5 |
| RFM231LPDE | 40.39 | 76.5 | 141.0 | 138.5 | 30.0 | 8.0 | 52.5 |
| RFM253LPDE | 44.20 | 82.7 | 148.5 | 148.1 | 30.0 | 8.0 | 54.0 |
| RFM295LPDE | 48.51 | 84.9 | 153.5 | 152.4 | 32.0 | 8.0 | 56.0 |
| RFM320LPDE | 52.83 | 87.8 | 159.5 | 158.1 | 32.0 | 8.0 | 59.0 |
| RFM350LPDE | 54.86 | 92.1 | 167.5 | 166.2 | 32.0 | 8.0 | 63.0 |

NOTES: UNLESS OTHERWISE SPECIFIED
 1 Stand-off range that removal tool will accommodate.

**LOCKRING
REMOVAL TOOL**

**RFM()LPDE
SERIES**



| FITTING CAP PAR NUMBER [3] | TUBING OD REF | A THREAD MA1370 -4H5H | B DIA ±0.5 | C ±0.30 | D ±0.4 | O-RING DASH NUMBER [4] REF | FITTING CAP WEIGHT WITH O-RING Kg/100 pcs REF |
|----------------------------|---------------|-----------------------|------------|---------|--------|----------------------------|---|
| RF70CM1010() | 5.0 | MJ10 X 1 | 15.9 | 7.60 | 4.0 | -011 | 3.217 |
| RF70CM1212() | 6.0 | MJ12 X 1.25 | 17.5 | 8.40 | 4.0 | -012 | 3.994 |
| RF70CM1415() | 8.0 | MJ14 X 1.5 | 19.5 | 9.40 | 5.0 | -013 | 5.264 |
| RF70CM1615() | 10.0 | MJ16 X 1.5 | 22.2 | 9.65 | 5.0 | -015 | 6.777 |
| RF70CM1815() | 12.0 | MJ18 X 1.5 | 23.7 | 9.90 | 5.0 | -016 | 7.520 |
| RF70CM2015() | 14.0 | MJ20 X 1.5 | 25.4 | 9.90 | 5.0 | -017 | 8.232 |
| RF70CM2215() | 16.0 | MJ22 X 1.5 | 27.0 | 9.90 | 5.0 | -018 | 8.802 |
| RF70CM2415() | 18.0 | MJ24 X 1.5 | 30.2 | 9.90 | 5.0 | -020 | 11.628 |
| RF70CM2715() | 20.0 | MJ27 X 1.5 | 33.2 | 10.40 | 5.0 | -022 | 13.396 |
| RF70CM3015() | 22.0 | MJ30 X 1.5 | 35.6 | 10.40 | 5.0 | -023 | 14.737 |
| RF70CM3315() | 25.0 | MJ33 X 1.5 | 38.1 | 10.40 | 5.0 | -025 | 15.814 |
| RF70CM3615() | 28.0 | MJ36 X 1.5 | 41.5 | 10.40 | 5.0 | -027 | 17.390 |
| RF70CM3915() | 32.0 | MJ39 X 1.5 | 44.5 | 10.40 | 5.0 | -126 | 18.165 |

NOTES: UNLESS OTHERWISE SPECIFIED

- MATERIAL: CAP: Aluminum.
O-Ring: See Note [4]
- FINISH: Red anodize for RF70CM()D series
Blue anodize for RF70CM()B series

- [3] Part number coding:
Add "-D" to basic part number when used with MIL-H-5606 hydraulic fluid and fuel.
Add "-B" to basic part number when used with Skydrol and other Phosphate Esters.
- [4] For "-D": O-ring per MIL-P-83461/1, compound per MIL-P-25732.
For "-B": O-ring per AS568, compound per NAS1613.

**FITTING CAP - SHIPPING,
MALE BEAM CLOSURE, METRIC**

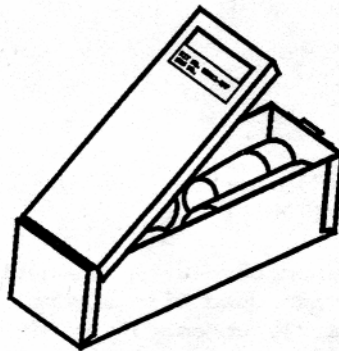
**RF70CM()
SERIES**

TABLE X - TOOL KITS

| PORT END SIZE | | KIT PART NUMBER | KIT CONTENTS (1 EACH) | | | |
|-----------------------------|-------------|-----------------|-----------------------|--------------|--------------------|-----------------------|
| PORT DASH NO. | THREAD SIZE | | O-RING INSTL TOOL | WRENCH | LOCKING DRIVE TOOL | LOCKRING REMOVAL TOOL |
| PS10047 MA2110 EN2602 | REF | | | | | |
| -077 | MJ6 X 1 | MKM11-077 | ORTM0610 | RFM6828-077W | RFM6828-077D | RFM077LPDE |
| -098 | MJ8 X 1 | MKM11-098 | ORTM0810 | RFM6828-098W | RFM6828-098D | RFM098LPDE |
| -125 | MJ8 X 1 | MKM11-125 | ORTM1010 | RFM6828-125W | RFM6828-125D | RFM125LPDE |
| -136 | MJ12 X 1.25 | MKM11-136 | ORTM1212 | RFM6828-136W | RFM6828-136D | RFM136LPDE |
| -153 | MJ14 X 1.5 | MKM11-153 | ORTM1415 | RFM6828-153W | RFM6828-153D | RFM153LPDE |
| -170 | MJ16 X 1.5 | MKM11-170 | ORTM1615 | RFM6828-170W | RFM6828-170D | RFM170LPDE |
| -192 | MJ18 X 1.5 | MKM11-192 | ORTM1815 | RFM6828-192W | RFM6828-192D | RFM192LPDE |
| -214 | MJ20 X 1.5 | MKM11-214 | ORTM2015 | RFM6828-214W | RFM6828-214D | RFM214LPDE |
| -231 | MJ22 X 1.5 | MKM11-231 | ORTM2215 | RFM6828-231W | RFM6828-231D | RFM231LPDE |
| -253 | MJ24 X 1.5 | MKM11-253 | ORTM2415 | RFM6828-253W | RFM6828-253D | RFM253LPDE |
| -295 | MJ27 X 1.5 | MKM11-295 | ORTM2715 | RFM6828-295W | RFM6828-295D | RFM295LPDE |
| -320 | MJ30 X 1.5 | MKM11-320 | ORTM3015 | RFM6828-320W | RFM6828-320D | RFM320LPDE |
| -350 | MJ33 X 1.5 | MKM11-350 | ORTM3315 | RFM6828-350W | RFM6828-350D | RFM350LPDE |

NOTE: TOOLS IN THESE KITS WILL INSTALL AND REMOVE THE FOLLOWING METRIC ADAPTER SERIES:

- 6520-490000-00 SERIES - ADAPTER, 60° FLARELESS TUBE (EN2606)
- 6530-490000-00 SERIES - ADAPTER, 60° FLARELESS TUBE (AS43034)
- 6660-490000-00 SERIES - ADAPTER, 24° FLARELESS TUBE (EN2605)
- 6828-490000-000 SERIES - PLUG, HYDRAULIC
- 7017-490000-00 SERIES - ADAPTER, BEAM SEAL (EN2604)
- 7027-490000-00 SERIES - ADAPTER REDUCER, BEAM SEAL (EN2604)



**TOOL KITS
ADAPTERS, CHECK VALVES, FILTERS,
QUICK DISCONNECTS AND REDUCERS**

**MKM11-()
SERIES**

United States Customer Teams

• REGIONAL OFFICES •

Customer Team Washington D.C.

45025 Aviation Drive, Suite 2
Dulles, VA 20166 USA
Tel: 703.742.4450
Fax: 703.742.4451

Customer Team Dallas

701 Highlander Boulevard, Suite 450
Arlington, TX 76015 USA
Tel: 817.417.0677
Fax: 817.417.0678

Customer Team Los Angeles

3016 West Lomita Boulevard
Torrance, CA 90505 USA
Tel: 310.784.0700
Fax: 310.784.6665

Customer Team Seattle

Fisher Business Center, Suite 605
3400 188th Street S.W.
Lynnwood, WA 98037 USA
Tel: 425.712.1599
Fax: 425.744.1283

• DISTRIBUTION OFFICES •

Customer Team-Distribution Dallas

701 Highlander Boulevard, Suite 360
Arlington, TX 76015 USA
Tel: 817.417.4128
Fax: 817.417.4129

Customer Team-Worldwide Distribution Los Angeles

3016 West Lomita Boulevard
Torrance, CA 90505 USA
Tel: 310.784.6400
Fax: 310.784.6608

European Customer Teams

• AEROSPACE OFFICES •

Customer Team Hildesheim

P.F. 10 13 20, Steven 3
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Santa Ana, CA 92704 USA
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Camloc / RAM / Tridair / Voi-Shan
3000 West Lomita Boulevard
Torrance, CA 90505 USA
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Fax: 310.784.6606

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Camloc / Tridair
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Eurosim / Simmonds
Parque Industrial da Guarda
Lotes 53/54 6300 Guarda Portugal
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Fullerton: Plant 2

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801 S. Placentia Ave.
Fullerton, CA 92831 USA
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Placentia

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44 Campanelli Parkway
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Fémipari KFT

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Screwcorp / Voi-Shan
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Conches

Mecaero
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27910 Conches, France
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Integrated Product Service Solutions

Fairchild Fasteners Direct

20660 Nordhoff Street
Chatsworth, CA 91311 USA
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Fax: 818.407.5945

Part of Fairchild Fasteners

Fairchild Fasteners Direct: Germany

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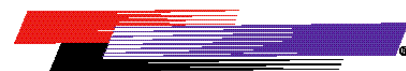
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