

Table of Contents

D. Fluid (Hydraulic) Modules	2
F2Hx14x Family	2
1. Product Overview	2
2. Installation	4
2.1 Installation.....	4
2.2 Removal	4
3. Operation	5
4. Maintenance.....	6
5. Troubleshooting	7
6. Specifications	7
7. Drawings.....	8
7.1 Hydraulic Schematic (9630-20-HYD).....	8
7.2 Coupler Maintenance (9630-20-COUPLER).....	9
7.3 F2Hx14x Hydraulic Module	10

D. Fluid (Hydraulic) Modules

F2Hx14x Family

1. Product Overview

The ATI F2Hx14x family of modules provides a method of attaching plate-mounted, 1/4 inch, high-pressure fluid couplers to ATI Tool Changers. The modules are designated as hydraulic fluid couplers, but other fluid types are possible (contact ATI for details as necessary). Each model is unique for its particular application, but they share various common features. Refer to the table and figures below for a description of the specific modules being presented in this section.

Specifications for each module will be listed on its customer drawing (see *Section 7—Drawings*). Do not exceed the operating pressures or conditions listed on the product line customer drawing.

F2HG14A-M	(2) G1/4, 2300 PSI [160 Bar] MAX per Coupler
F2HG14A -T	<i>Maximum Total Pressure = 3000 PSI [207 Bar]</i>
F2HG14B-M	(2) G1/4, 3000 PSI [207 Bar] MAX per Coupler
F2HG14B -T	<i>Maximum Total Pressure = 3000 PSI [207 Bar]</i>
F2HN14A-M	(2) 1/4 NPT, 2300 PSI [160 Bar] MAX per Coupler
F2HN14A -T	<i>Maximum Total Pressure = 3000 PSI [207 Bar]</i>
F2HN14B-M	(2) 1/4 NPT, 3000 PSI [207 Bar] MAX per Coupler
F2HN14B -T	<i>Maximum Total Pressure = 3000 PSI [207 Bar]</i>
F2H14PC-T	Protective cover for tool side w hen no tool module is present.

Table 1.1 – Hydraulic Coupler Modules



WARNING: To protect the integrity of the module, do not exceed a combined pressure of 3000 psi (207 bar) on both ports. If pressure is exceeded, damage may occur to equipment and personnel.

NOTE:

Each coupler half is self-sealing.

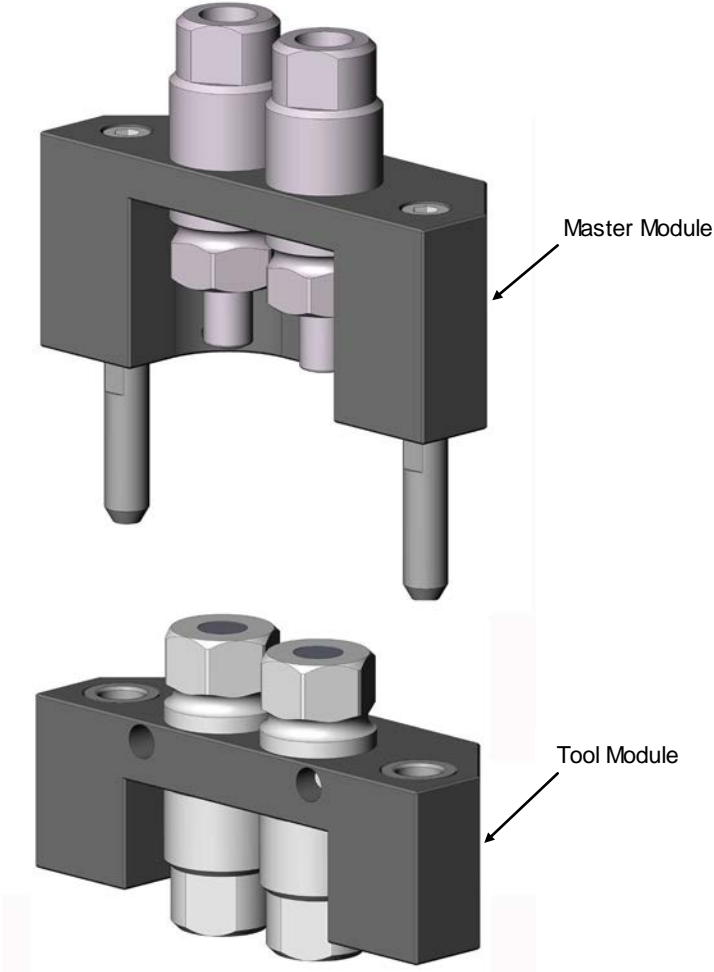


Figure 1.1—F2Hx14x Fluid Module (F2HN14B shown)

2. Installation

The modules are typically installed by ATI prior to shipment. The steps below outline field installation or removal as required.



WARNING: Do not perform maintenance or repair on Tool Changer or modules unless the tool is safely supported or docked in the tool stand and all energized circuits (e.g. electrical, air, water, etc.) have been turned off. Injury or equipment damage can occur with tool not docked and energized circuits on. Dock the tool safely in the tool stand and turn off all energized circuits before performing maintenance or repair on Tool Changer or modules.

2.1 Installation

1. Thoroughly clean the mounting surface on both the Tool Changer body and the fluid module housing.
2. Remove the hydraulic couplers from the assembly to access the mounting screws. (Refer to *Section 7—Drawings*.)
3. With the couplers removed, align the module's dowels with the corresponding holes in the pattern on the Tool Changer body.
4. Insert the dowels and tighten the M4 socket head caps screws. (Refer to the in *Section 7—Drawings* for the number of fasteners, thread locking materials, and torque requirements.)
5. With the module housing secured to the Tool Changer body, reinstall the coupler halves in the housing and tighten the front and rear coupler halves together. (See *Section 7—Drawings* for the coupler torque requirements.)
6. After the couplers have been secured the hoses can be connect to the adapter sockets.

2.2 Removal

1. Discharge all hydraulic pressure prior to performing any work.
2. Disconnect all hoses and drain away trapped fluid.
3. Follow the installation steps (above) in reverse order to remove the modules from the Tool Changer.

3. Operation

The hydraulic modules are designed to pass fluid from the Master to the Tool for use by the customer's tooling.

The couplers utilize self-sealing components so that the fluid circuits do not discharge during tool change. The couplers are specified as flat-face, no-drip. However, there will be modest residual fluid on the surface of the couplers when uncoupling. The amount of this fluid will depend mainly upon the type of fluid being passed.

Due to the length of the coupler components, it will be necessary for the customer's equipment to drive the Master and Tool together. Minimizing trapped pressure in the fluid system will reduce the required force. The reaction/separation force produced by the pressure in the couplers may be calculated using the formulas on the customer drawings (see *Section 7—Drawings*).

It is important to read and understand the ATI's hydraulic plumbing schematic that explains proper plumbing techniques to avoid problems. A copy of this drawing is at the end of this document. An overview of the basic requirements is provided in the bullet list below. (NOTE: ATI does not sell hydraulic components or recommend a particular brand or type of accumulator. Please consult your hydraulic equipment supplier for guidance.)

In all liquid coupling applications, the customer is advised to take the following steps:

- Plumb the couplers using flexible hoses, which are able to absorb pressure spikes and pulses. Highly reinforced hoses and hard pipe must not be used.
- Turn off the supply pump or divert the fluid to the reservoir and discharge pressure in the lines prior to a tool change.
- Hydraulic pressure accumulators should be installed on both the Master and Tool side plumbing. This is particularly important on the Tool side, even with the pump turned off and Master side pressure discharged.
- During routine maintenance of the Tool Changer, the couplers should be inspected and re-lubricated. Water and most solvents will wash away lubricants necessary to prolong seal life.



CAUTION: Failure to follow these steps will result in premature seal failure, jetting of fluid from the couplers during tool changes, and significant pressure pulses in customer tooling.



CAUTION: To maximize the life and performance of fluid/air components, read and follow the steps in the Operations section of this manual.

4. Maintenance

The couplers consist of a front working part containing the valve and seal components and a rear portion with pipe threads. The front portion of the coupler may be unscrewed from the rear portion and removed without disturbing any plumbing or pipe fittings. This allows the customer to rapidly replace worn coupler parts minimizing lost production time. The torque required to secure the front and rear coupler halves to each other is listed on the drawings in *Section 7—Drawings*.

The operation of the fluid modules is generally trouble free if ATI's guidelines are adhered to. In hydraulic applications, the coupler seals are typically lubricated by the fluid. In circuits passing water, cleaning agents or other chemicals it will be necessary to inspect and re-lubricate the seals more frequently. For non-hydraulic applications, the service interval must be determined by the customer as it will be unique to the fluid being passed. Minor re-lubrication may be carried out by draining the system and couplers, pushing the coupler valve components open using a small screwdriver, and injecting a small amount of air tool oil. More complete lubrication will require removal of the couplers, disassembling them to their discrete parts, and application of a basic NLGI-2 type grease to all the seals. An exploded maintenance drawing of the couplers is shown in *Section 7—Drawings*.

5. Troubleshooting

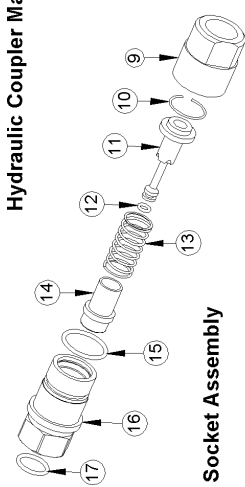
Problem	Cause	Remedy
Fluid Leakage	Damaged/Worn coupler or seals	Replace coupler.
Poor Flow	Flow path blockage	Inspect valve components and supply/return lines for blockage, clean/repair as necessary.
Modules Won't Couple	Misaligned modules, excess pressure	Examine and replace the pre-alignment pins as necessary. Discharge trapped pressure prior to coupling.

6. Specifications

Fluid Module	Weight	Coupler Materials	Fluid Ports, (qty) Size, Cv	Application Notes
9120-F2HN14A-M 9120-F2HN14A-T	1.56 lb (0.71 kg) 1.34 lb (0.61 kg)	Stainless Steel, Viton Seals	(2) 1/4 NPT, 0.46	2300 PSI MAX Pressure per Port 3000 PSI MAX Total Pressure
9120-F2HN14B-M 9120-F2HN14B-T	1.56 lb (0.71 kg) 1.34 lb (0.61 kg)	Stainless Steel, Viton Seals	(2) 1/4 NPT, 0.46	3000 PSI MAX Pressure per Port 3000 PSI MAX Total Pressure
9120-F2HG14A-M 9120-F2HG14A-T	1.56 lb (0.71 kg) 1.34 lb (0.61 kg)	Stainless Steel, Viton Seals	(2) G1/4 (BSPP), 0.46	2300 PSI MAX Pressure per Port 3000 PSI MAX Total Pressure
9120-F2HG14B-M 9120-F2HG14B-T	1.56 lb (0.71 kg) 1.34 lb (0.61 kg)	Stainless Steel, Viton Seals	(2) G1/4 (BSPP), 0.46	3000 PSI MAX Pressure per Port 3000 PSI MAX Total Pressure
9120-F2H14PC-T	0.75 lb (0.34 kg)	N/A	N/A	Protective cover for use when no tool module is present.

7.2 Coupler Maintenance (9630-20-COUPLER)

Hydraulic Coupler Maintenance	Rev.	Description	Indicator	Date	

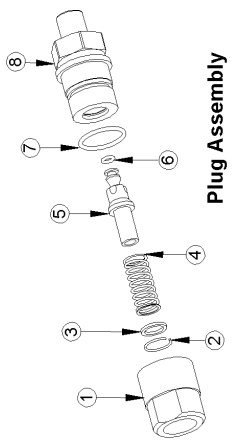


Socket Assembly

Socket Maintenance:

1. Separate the coupler halves by unscrewing the pipe thread adapter from the coupler front body.
2. Secure the coupler front body in a soft-jaw vice.
3. Use a sharp, hook-end pick to pry the spring circlip from the rear of the body.
4. Withdraw the circlip, valve body, spring, and sleeve from the coupler.
5. Remove the large o-ring from the rear of the coupler body.
6. Remove the small o-ring from the valve body.
7. Remove the medium o-ring from the bore of the coupler front body.

- Reassembly is the reversal of the above.
- During reassembly use new seals when possible.
- Lubricate the new seals and coupler bore with grease (NLGI-2)
- When re-mounting the coupler, tighten the front and rear halves to the torque recommended on the particular module's 9630 drawing.

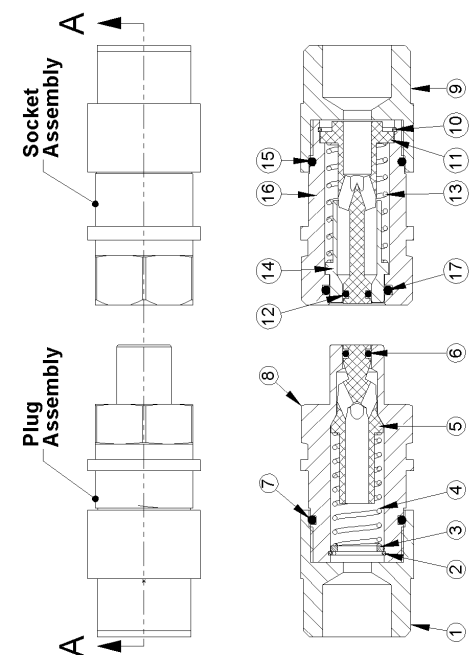


Plug Assembly

Plug Maintenance:

1. Separate the coupler halves by unscrewing the pipe thread adapter from the coupler front body.
2. Secure the coupler front body in a soft-jaw vice.
3. Use a sharp, hook-end pick to pry the spring circlip from the rear of the body.
4. Withdraw the circlip, flat washer, spring, and valve body from the coupler.
5. Remove the large o-ring from the rear of the coupler body.
6. Remove the small o-ring from the valve body.

- Reassembly is the reversal of the above.
- During reassembly use new seals when possible.
- Lubricate the new seals and coupler bore with grease (NLGI-2)
- When re-mounting the coupler, tighten the front and rear halves to the torque recommended on the particular module's 9630 drawing.



SECTION A-A

Item	Description
9	Pipe Thread Adapter, Socket
10	Spring Circlip, Socket
11	Valve Body, Socket
12	Small O-Ring, Socket
13	Spring, Socket
14	Sleeve, Socket
15	Large O-Ring, Socket
16	Coupler Front Body, Socket
17	Medium O-Ring, Socket

Item	Description
1	Pipe Thread Adapter, Plug
2	Spring Circlip, Plug
3	Flat Washer, Plug
4	Spring, Plug
5	Valve Body, Plug
6	Small O-Ring, Plug
7	Large O-Ring, Plug
8	Coupler Front Body, Plug

NOTES: UNLESS OTHERWISE SPECIFIED:

- DO NOT SCALE DRAWING.
- DIMENSIONS ARE IN MILLIMETERS.

ATI INDUSTRIAL AUTOMATION

1031 Goodworth Drive, Apex, NC 27539, USA
 Tel: +1919.772.0115 Email: info@ati-ia.com
 Fax: +1919.772.8259 www.ati-ia.com
 ISO 9001 Registered Company

Hydraulic Coupler Service Instructions

DRAWN BY: D.Lawson-7/1/11
 CHECKED BY: D.Stevenson-7/1/11

SCALE: 1:1
 SHEET 1 OF 1

PRODUCT # 110630-2
 DRAWING NUMBER: 9630-20-COUPLER

REVISION: 01

7.3 F2Hx14x Hydraulic Module

1/4 Inch Hydraulic Module Specifications

Hydraulic Ports, (Qty Size, C.) (2) 1/4", (0.46)
 (Self-sealing on Master and Tool)

DO NOT exceed 3000 PSI (207 Bar) MAX Total Pressure.
 DO NOT exceed 2300 PSI (160 Bar) MAX on Individual "A" Couplers.
 DO NOT exceed 3000 PSI (207 Bar) MAX on Individual "B" Couplers.

Static Separation Force
 36 lb [160 N]

Hydraulic Separation Force ***
 (lb) = 0.13 x PSI
 (N) = 8.4 x Bar

*** Only one port is to be pressurized at any given time.

Note 1: In the part numbering scheme "F2HX14X" replace the first "X" with "G" for G (BSPP) or "N" for NPT threads and the second "X" with "A" or "B" for 2300 PSI or 7200 PSI couplers respectively.

Refer to ATI Drawings: For information on Coupler Plumbing and Application/Use, 9630-20-HYD. For information on Coupler Maintenance, 9630-20-COUPLER. For information on Coupler Maintenance, ALL Connections MUST be by Flexible Lines/Hoses. Hard Pipe is NOT Permissible.

Master Module (See Note 1)
 9120-F2HX14X-M

Tool Module (See Note 1)
 9120-F2HX14X-T

Master Module (See Note 1)
 Mounting Hardware (Provided)

Tool Module (See Note 1)
 9120-F2HX14X-T

Tool Side Protective Cover Module (See Note 1)
 9120-F2H14PC-T (Optional)

Protective Cover

ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	6	3500-1062012-15A	M4-0.7 x 12mm SHCS, Blue, Pre-Applied
2	2	3510-5016005-21	Fender Washer, 3/16"x1", .05" Thk, SS
3	2	3700-20-8497	F2H14PC-T Coupler Shroud
4	1	9005-20-2238	F2H14 Carrier Assembly, Tool

An optional protective cover is available and may be used when hydraulic couplers are not required on the tool side.

Tool Module (See Note 1)
 9120-F2HX14X-T

Master Module (See Note 1)
 9120-F2HX14X-M

Tool Module (See Note 1)
 9120-F2HX14X-T

Master Module Parts

ITEM NO.	QTY.	PART NUMBER	APPLICATION	DESCRIPTION
1	2	3405-1220028-01	F2HN14B	QD Plug, 1/4NPT, 2300 PSI, Viton Seals
	2	3405-1220028-01	F2HN14A	QD Plug, 1/4NPT, 2300 PSI, Viton Seals
	2	3405-1220023-01	F2HG14B	QD Plug, G1/4, 7200 PSI, Viton Seals
	2	3405-1220009-01	F2HG14A	QD Plug, G1/4, 2300 PSI, Viton Seals
5	4	3500-1062012-15A	ALL	M4-0.7 x 12mm SHCS, Blue, Pre-Applied
6	2	3500-1066016-15A	ALL	M6-1 x 16mm SHCS, Blue, Pre-Applied
7	2	3700-20-4517	ALL	Hydraulic Module Alignment Pin
8	1	9005-20-2237	ALL	F2H14-M Carrier Assembly

Tool Module Parts

ITEM NO.	QTY.	PART NUMBER	APPLICATION	DESCRIPTION
2	3405-1220033-01	F2HN14B	QD Socket, 1/4NPT, 7200 PSI, Viton Seals	
2	3405-1220027-01	F2HN14A	QD Socket, 1/4NPT, 2300 PSI, Viton Seals	
1	2	3405-1220024-01	F2HG14B	QD Socket, G1/4, 7200 PSI, Viton Seals
2	3405-1220010-01	F2HG14A	QD Socket, G1/4, 2300 PSI, Viton Seals	
5	4	3500-1062012-15A	ALL	M4-0.7 x 12mm SHCS, Blue, Pre-Applied
6	1	9005-20-2238	ALL	F2H14 Carrier Assembly, Tool

Notes: UNLESS OTHERWISE SPECIFIED, DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN INCHES.

PROPERTY OF ATI INDUSTRIAL AUTOMATION, INC. NOT TO BE REPRODUCED IN ANY MANNER EXCEPT ON ORDER OR WITH PRIOR WRITTEN AUTHORIZATION OF ATI.

Coupler Halves Uncrew for Installation in Carrier Assemblies
 Mount Carrier Assemblies to Tool Changer Before Installing Couplers

1031 Goodworth Drive, Apex, NC 27539, USA
 Tel: +1 919.772.0115 Email: info@ati-ia.com
 Fax: +1 919.772.8259 www.ati-ia.com
 ISO 9001 Registered Company

ATI INDUSTRIAL AUTOMATION

DESIGNED BY: D. Lawson-1/24/14
 CHECKED BY: D. Wagner-1/27/14

TITLE: F2HX14X Customer Drawing

SCALE: 1:4
 SHEET: 1 of 1
 PROJECT #: 131009-1
 DRAWING NUMBER: 9630-20-F2HX14X
 REGION: 02