

Power Workholding

Power Workholding ■ Precision Vises ■ Zero Point Mounting ■ Assembly and Handling



ROEMHELD

HILMA ■ STARK

CARR LANE ROEMHELD MFG. CO.

OUR STORY

CARR LANE ROEMHELD MFG. CO.

In 1982 an independent joint venture was established to marry the proven product expertise of Roemheld with the marketing know-how and distribution network of Carr Lane Manufacturing. This partnership now offers to the American manufacturer the complete benefits of the finest in international power workholding combined with the best in local service and support.

After initial tests by many companies, both small and large, the word had spread confirming the quality and reliability obtained when using Roemheld Power Workholding products.

We invite you to review this catalog in depth and to call us with any questions about your applications. We at Carr Lane Roemheld welcome the opportunity to help you manufacture your quality product in the most productive way possible — with the world's most dependable workholding equipment.



Founded in 1952 in St. Louis, Missouri by Earl Walker to make standardized tooling components, Carr Lane Manufacturing has grown, through constant innovation, to become the foremost supplier to the American Machine Tool Industry. Now the most complete line available, Carr Lane Mfg. offers Jig and Fixture Components, Toggle Clamps, Hoist Rings, Alignment Pins, Drill Bushings, Spring Plungers, and Modular Fixturing. Setting the standard for American Tool Engineers, Carr Lane Manufacturing's catalog is recognized as the engineer's tooling reference.



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Drawing upon a centuries-old tradition of German craftsmanship, metalworking was already well established in Laubach, Germany when the Roemheld family began to manage operations in 1870. Development of the hydraulic workholding components began in the early 1960's and soon grew to dominate the European market.

Today, Roemheld GmbH is by far the world leader in this productivity-enhancing technology, offering a tremendous range of types and sizes of superior design and the highest quality.



SUCCESS GUARANTEED

Find out the advantages of our Quality Guarantee when you work with us!

Carr Lane Roemheld knows your power workholding system needs to be of the highest quality.

That's why, if you work with us, you'll get the best system, and top quality results.

We stand behind our products, and provide you with the excellent service you need to remain competitive in today's manufacturing environment.



Concentric Clamping Elements

Block Cylinders

Work Supports

Locking Piston Cylinders

Swing Clamps

Fittings & Accessories

Valves

Push Clamps

Extending Clamps

Vises

Power Sources

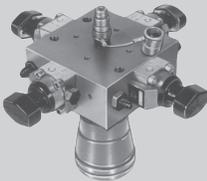
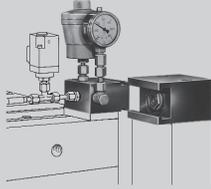
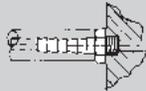
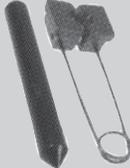


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Rotary Couplings

7250 psi max
Single acting



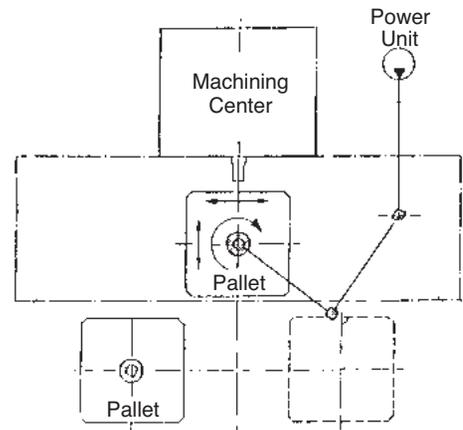
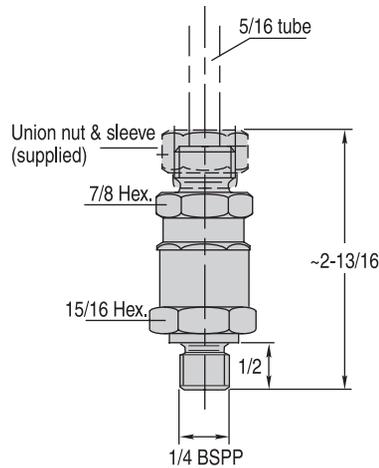
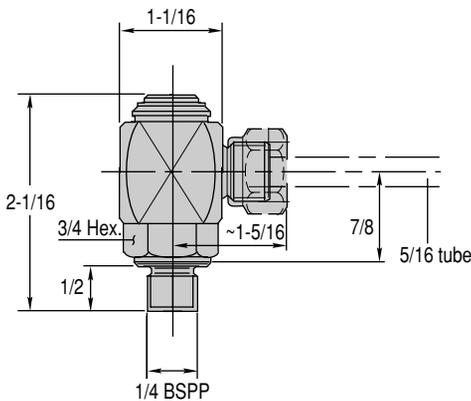
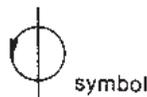
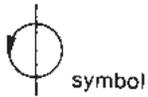
Single Passage —
Elbow



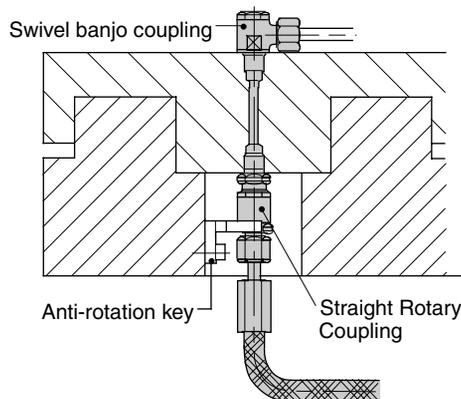
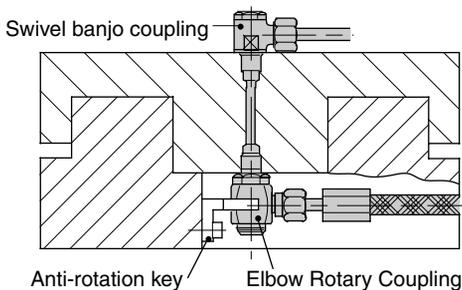
Single Passage —
Straight

- Best choice for feeding fluid to rotating pallet changers, due to constant connection.
- Ideal for rotary index tables.
- Also good for elbow connections that regularly swing through a small arc
- Choice of elbow or straight version
- ** Do not use NPT fittings

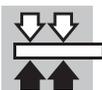
MOUNTING: Mount at rotational center to prevent side loading. Screw into standard 1/4 BSPP port.



Machining-center pallet changer with continuous fluid feed using Rotary Couplings.



Number of passages	1
Operating pressure range (psi)	145 - 7250
Maximum rotational speed (RPM)	10
Max. seating torque (ft-lbs)	44
Starting torque at 7500 psi (ft-lbs)	1.0
Part No., Elbow	CLR-843-F
Part No., Straight	CLR-845-F



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Rotary Couplings

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Single and double acting



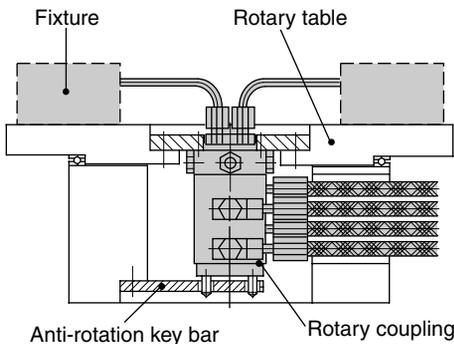
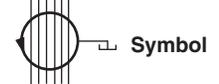
Two Passage



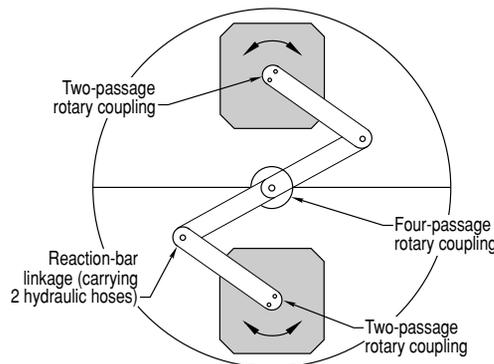
Four Passage



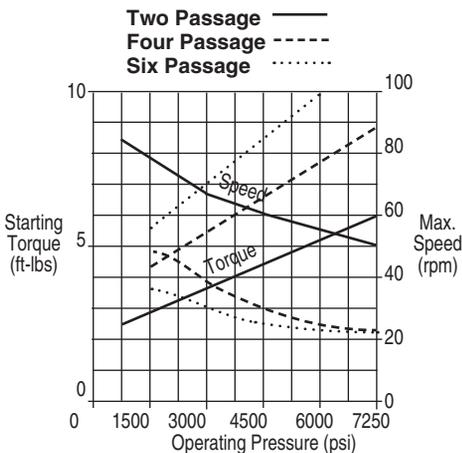
Six Passage



Four-pass rotary coupling with a reaction-bar linkage to prevent stress on hose connections.



Rotary couplings are frequently used on horizontal machining centers with rotary pallet changers. A reaction-bar linkage holds the top portion of each two-pass coupling stationary while the bottom portion revolves freely. Couplings are not designed to carry load. Side load will cause excessive, uneven wear resulting in failure.



Number of passages	2	4	6
Max. flow rate (cu. in./min.)	493	493	493

Standard			
Leakage rate (cu. in./hr.)	.02	.04	—
Weight (lbs)	5.3	10.1	—
Part No., 150-7250 psi	CLR-9281-136-F	CLR-9284-036	—

With Leakage Recirculation			
Weight (lbs)	6.1	12.1	15.9
Part No., 150-7250 psi	CLR-9281-135	CLR-9284-135	CLR-9286-135



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Rotary Couplings

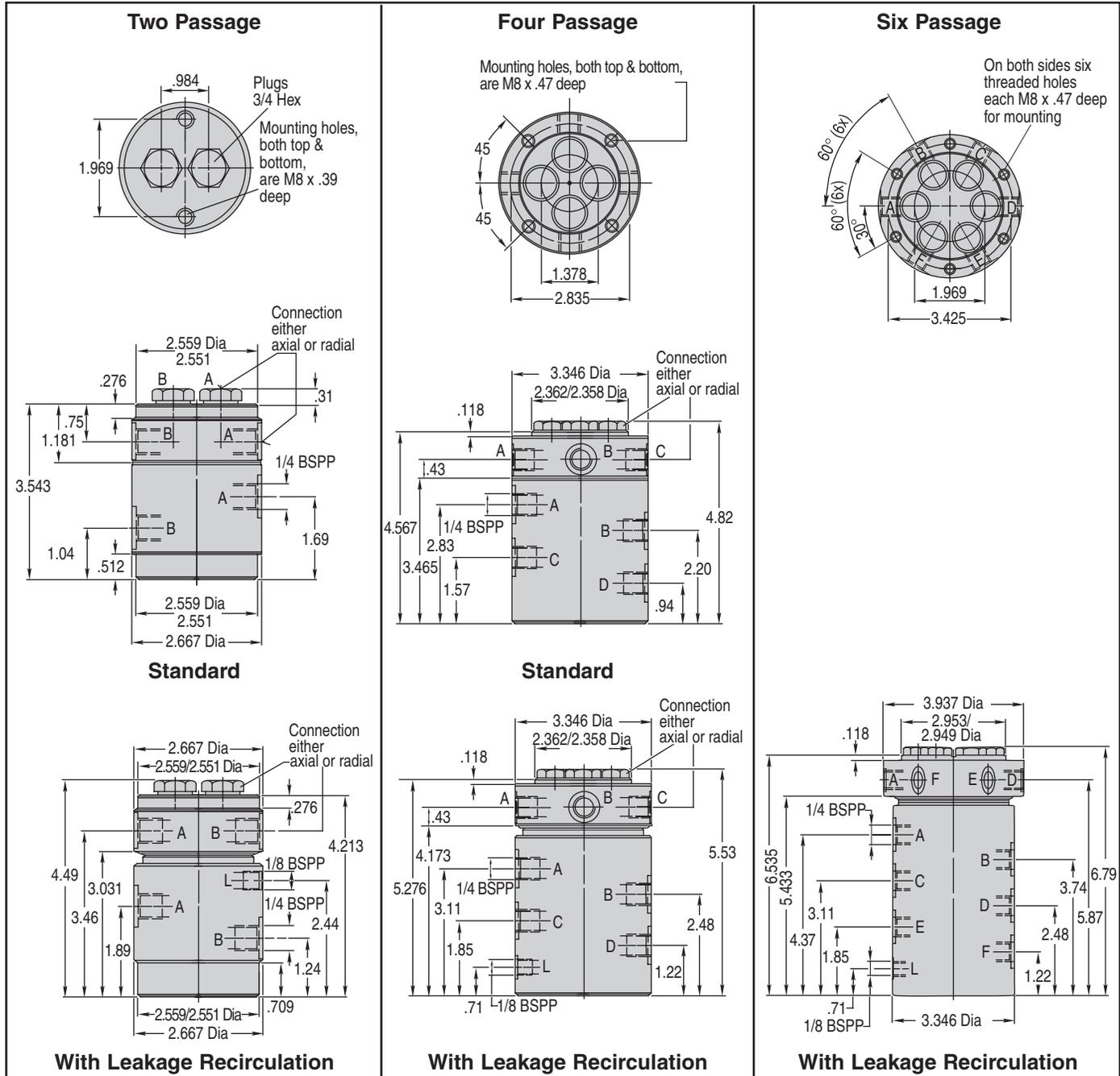
7250 psi max
Single and double acting

- Best choice for feeding fluid to rotating pallet changers, due to constant connection.
- Ideal for rotary index tables.
- Can also be used for double-acting clamps.
- Choice of two, four, or six independent passages.
- Specials are readily available. Please contact factory.

OPERATION: Each passage is supplied separately. This allows independent operation of two, four, or six (depending on model) sets of spring-return (single-acting) clamps.

MOUNTING: Either the top or bottom can be mounted by screws through the supplied holes. Do not hard mount both sides. Use anti-rotational key on one side.

DESIGN CONSIDERATIONS: The fluid pressure in the rotary coupling will add to the table's starting torque requirement and affect the maximum table operating speed. Please check the graph on the previous page. Fluid must be clean (10 micron or better nominal filtration). Couplings can not be side-loaded. Any weight applied will shorten the life of the unit.



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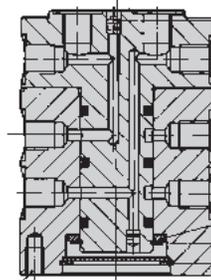
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Rotary Valve Couplings

7250 psi max
Single and double acting



- For rotary index tables with an independent load/unload station
- Unload and reload while all other stations remain clamped
- Unclamps automatically at load station, or via a clamping valve
- Available from stock for rotary tables with 2 through 8 stations



OPERATION: One half of the Rotary Valve Coupling rotates with the index table, while the other half remains stationary. Each time the table and coupling index, a new station automatically becomes the load/unload station. The coupling supplies fluid to the loading station separately from all other stations. The loading station can be either unclamped and reloaded automatically as the coupling rotates, or controlled by a separate clamping valve.

CLAMPING MANUALLY: The loading station can be clamped and unclamped manually (or by a machine controller's electrical signal) using a 3-way valve mounted off the rotating table. This insures that a new workpiece will not move during indexing, before it is securely clamped. See valves section for hand-, cam- or air pilot-operated valves. Double-acting clamps require a 4 way valve.

CLAMPING AUTOMATICALLY: To automatically unclamp and reclamp the load station as the coupling rotates, connect the coupling's return line R directly to the power source's reservoir (no pressure). To avoid any pressure drop as the table indexes, the power source's fluid flow rate (cu.in./min.) should be at least 240 times the fluid required at any one clamping station (cu.in.). Otherwise an accumulator must be installed on the pressure line from the power source.

DESIGN CONSIDERATIONS:

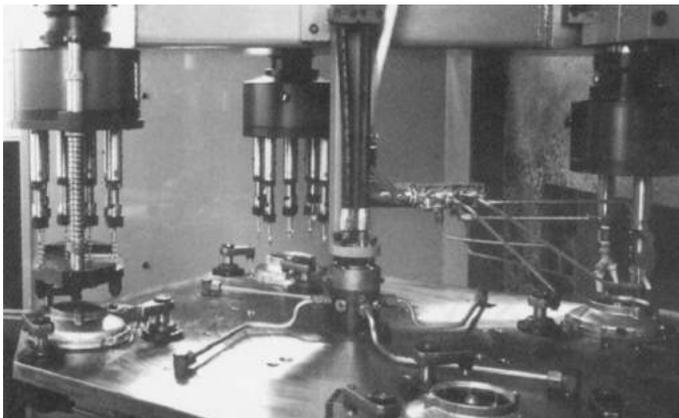
1. To use a standard Rotary Valve Coupling, the table must rotate through the same angle during each indexing movement.
2. Turning the coupling requires additional table-motor starting torque, especially when clamping automatically during indexing.
3. Maximum rotational speed is 10 RPM.
4. Use only with the following hydraulic fluids: those listed in F&A section. To use any other hydraulic fluid, check with factory first. Fluid must be clean (10 micron or better nominal filtration).
5. Do not turn coupling while dry, even before installation. Fill unused ports with fluid before capping off (e.g. when using an 8-station coupling for 4 stations).
6. Use only 1/4 BSPP fittings. Fitting-installation torque must be 28-35 ft.lbs.
7. Couplings can not carry load. Especially side load which will cause excessive, uneven wear.
8. With the load station unclamped, there is a small return-line leakage rate. Always install an accumulator, especially above 3000 psi.

MOUNTING: Firmly fasten either the top or bottom half of the coupling using the tapped mounting holes provided. Use a floating reaction bar to prevent the other half from rotating. Mount at the center of rotation, either above, below, or on the rotary table.

SPECIALS: For additional stations or special features, please contact factory.



Rotary Valve Couplings are also available for use with automatic coupling systems, for loading multi-sided tooling blocks. Please contact factory for information.



This application shows a multiple-spindle machine with four stations, for machining aluminum covers. An 8-station rotary valve coupling is at the center, with its four unused ports plugged.

Type of clamps	Single Acting	Double Acting
Max. operating pressure (psi)	7250	7250

Type 1 — Single Station for Load/Unload

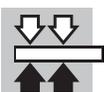
Part No., 5 station	CLR-9295-001-V	CLR-9295-002-V
Part No., 6 Station (also 2 & 3)	CLR-9296-001-V	CLR-9296-002-V
Part No., 8 Station (also 4)	CLR-9298-001-V	CLR-9298-002-V
Part No., 10 Station	CLR-9290-001-V	CLR-9290-002-V

Type 2 — Two Stations for Load/Unload Commonly Controlled

Part No., 6 station (also 2 & 3)	CLR-9296-011-V	CLR-9296-012-V
Part No., 8 Station (also 4)	CLR-9298-011-V	CLR-9298-012-V
Part No., 10 Station (also 5)	CLR-9290-011-V	CLR-9290-012-V

Type 3 — Two Stations for Load/Unload Separately Controlled

Part No., 6 station (also 2 & 3)	CLR-9296-101-V	CLR-9296-102-V
Part No., 8 Station (also 4)	CLR-9298-101-V	CLR-9298-102-V
Part No., 10 Station (also 5)	CLR-9290-101-V	CLR-9290-102-V



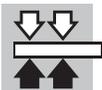
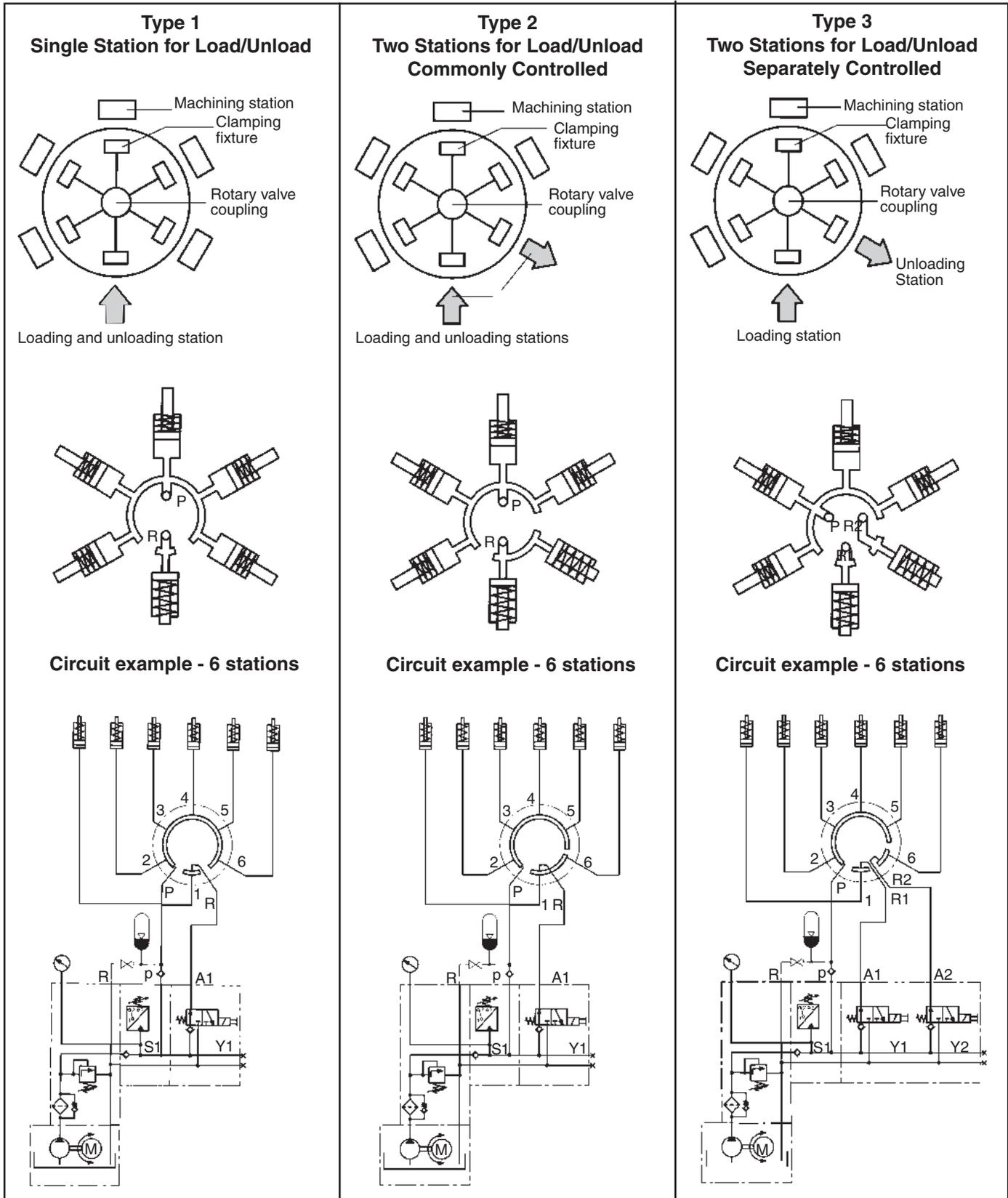
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Engineering — Phone 1-800-827-2526 Web www.clrh.com

Rotary Valve Couplings

7250 psi max
Single and double acting



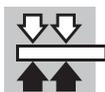
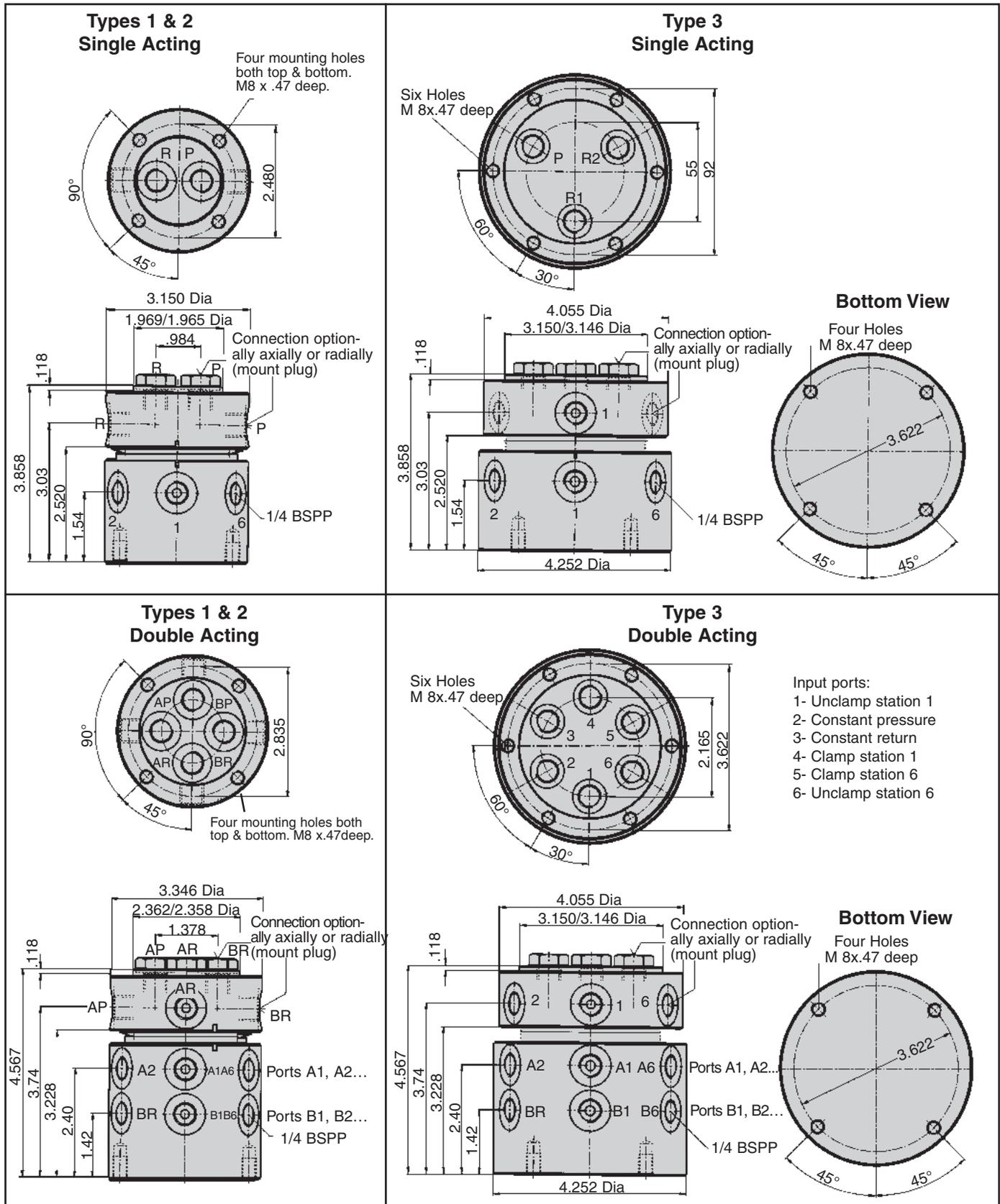
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Single and double acting



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Rotary Air Valve Couplings

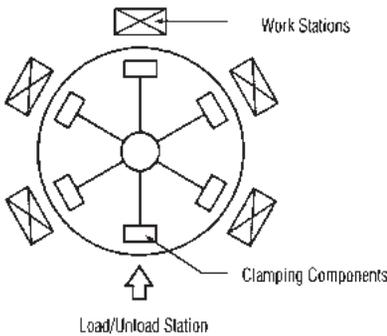
145 psi air max
Single and double acting



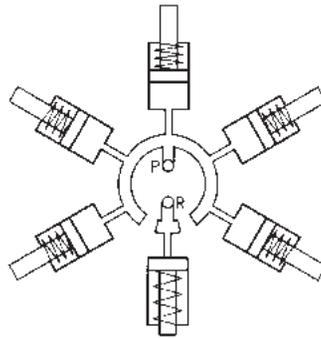
Single Acting

- For rotary index tables with an independent load/unload station
- Unload and reload while all other stations remain clamped
- Unclamps automatically at load station, or via a clamping valve
- Available from stock for rotary tables with 2 through 10 stations

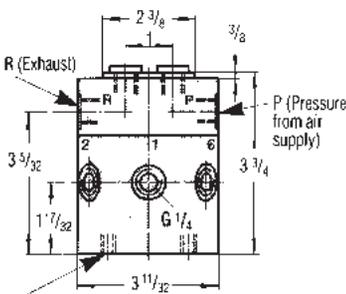
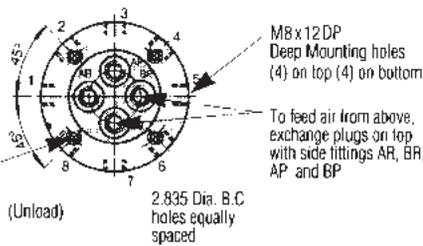
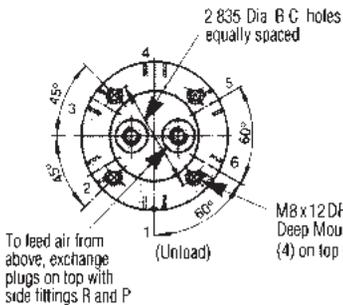
OPERATION: One half of the Rotary Valve Coupling rotates with the index table, while the other half remains stationary. Each time the table and coupling index, a new station automatically becomes the load/unload station. The coupling supplies loading station separately from all other stations. The loading station can be either unclamped and reclamped automatically as the coupling rotates, or controlled by a separate clamping valve.



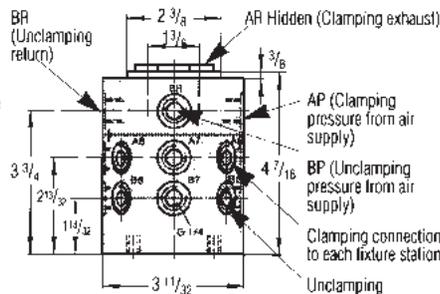
Single Acting



Double Acting



Bottom connections supply to each fixture station (1/4 BSPP Port, 1/4 BSPP male to 1/4 NPT adapter supplied. Ingestion of pipe dope or left on tape may cause malfunction or damage to valve)



DESIGN CONSIDERATIONS:

1. To use a standard Rotary Valve Coupling, workpiece must be unloaded and reloaded at the same station. Also, the table must rotate through the same angle during each indexing movement.
2. Turning the coupling requires additional table-motor starting torque, especially when clamping automatically during indexing.
3. Maximum rotational speed is 10 RPM.
4. Although couplings are well sealed, an external cover may be necessary to protect the coupling's siding surfaces against extreme dirt and grit.

CLAMPING BY CONTROL VALVE: The loading station can be clamped and unclamped manually (or by a machine controller's electrical signal) using a 3-way valve mounted off the rotating table. This insures that a new workpiece will not move during indexing, before it is securely clamped. Double-acting clamps require a 4-way valve.

MOUNTING: Firmly fasten either the top or bottom half of the coupling using the tapped mounting holes provided. Use a floating reaction bar to prevent the other half from rotating. Mount at the center of rotation, either above, below, or on the rotary table.

SPECIALS: For additional stations or special features, please contact factory. Possibilities include:

1. Any number of stations
2. Multiple load stations (2 or more)
 - Controlled independently or together
 - Side by side, opposite, or at any other orientation

Type Clamp	Single-Acting	Double-Acting
Max. Operating Pressure (psi)	145	145
Part No., 5 Station	CLR-9295-601-V	CLR-9295-602-V
Part No., 2, 3, 6 Station	CLR-9296-601-V	CLR-9296-602-V
Part No., 7 Station	CLR-9297-601-V	CLR-9297-602-V
Part No., 4, 8 Station	CLR-9298-601-V	CLR-9298-602-V



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Pallet Decouplers

7250 psi max
Single acting



Single Acting

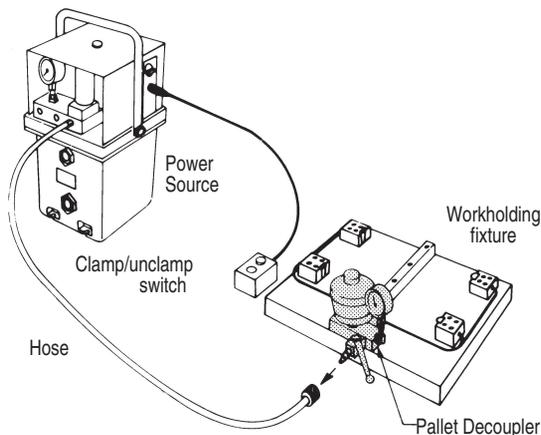
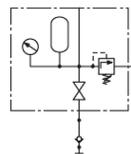
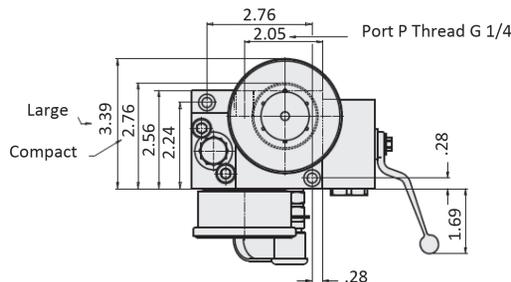
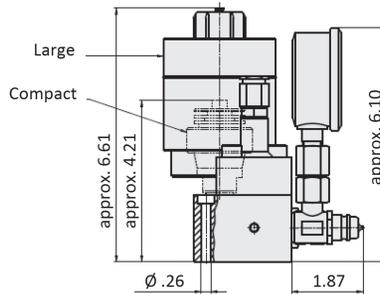
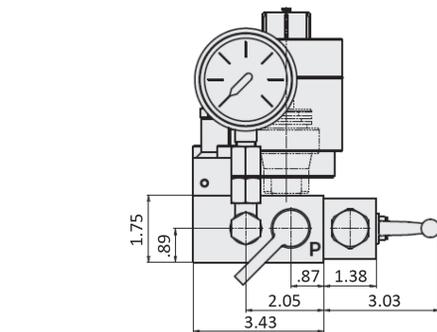
- Allows disconnecting a single-acting fixture from its power source before machining
- Compact assembly mounts easily on fixture (lay gauge flat for an even lower profile)
- Ideal for pallets and rotating fixtures where a fluid feed line is impractical
- Decoupler includes shutoff valve, quick disconnect, accumulator, pressure gauge, and pressure-relief valve
- Do not use NPT fittings

POWER UNIT: Any standard single-acting power unit can be used with this pallet decoupler.

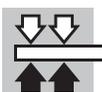
OPERATION:

1. Remove protective cap from male quick disconnect on decoupler. Clean coupling components if necessary.
2. Connect hydraulic hose, with female quick disconnect, to the pallet decoupler. The power unit should be in unclamped mode (depressurized) before connection.
3. Open shutoff valve on decoupler to unclamp fixture.
4. After unloading and reloading fixture, actuate power unit to clamp.
5. After pressure gauge shows proper clamping pressure, close shutoff valve on decoupler.
6. Switch power unit to unclamped mode.
7. Disconnect hose and replace protective cap on male quick disconnect. Hose can be connected to optional safety support while not in use.

SAFETY FEATURES: Pallet decouplers include an accumulator to compensate for pressure changes due to temperature variations. Important: use pallet decouplers only with Roemheld components, because all system components must be zero leakage. These decouplers are equipped with a pressure-relief valve to protect the fixture and the accumulator from extreme temperature increases. An optional safety support with a limit switch can be used to hold the hydraulic hose after uncoupling, to ensure that the fixture is disconnected before moving.



Accumulator Size	Compact	Large
Maximum operating pressure (psi)	7250	7250
Minimum operating pressure (psi)	1800	1800
Accumulator volume at 7250 psi (cu. in.)	0.6	3.4
Accumulator volume at 1800 psi (cu. in.)	0.16	0.9
Accumulator gas preload (psi)	1450	1450
Weight (lbs)	8.4	12.7
Part No., Decoupler	CLR-9425-012-PD	CLR-9425-011-PD
Part No., Female Disconnect	CLR-9384-106-F	
Part No., Safety Support	CLR-0942-001-PDA	



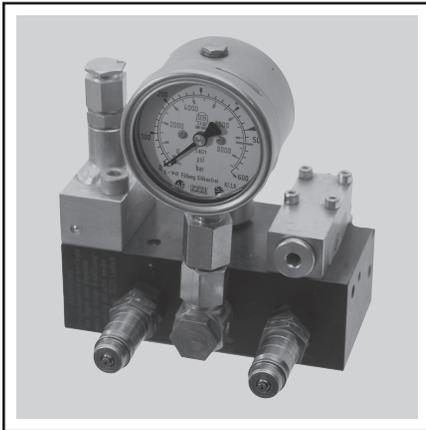
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Pallet Decouplers

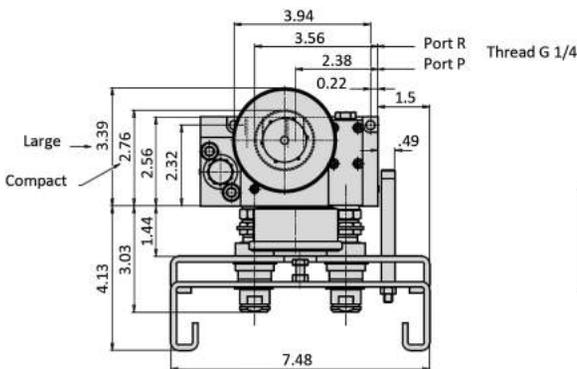
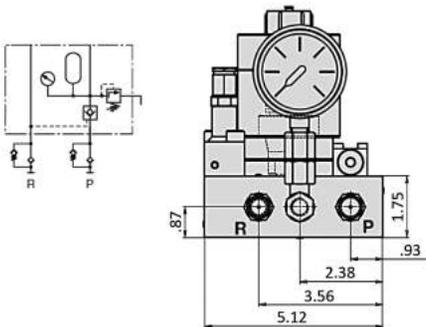
7250 psi max
Single or double acting



Single Acting or Double Acting with Automatic Shutoff

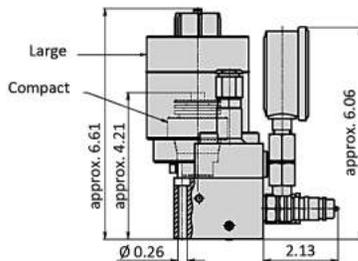
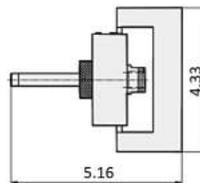
- Allows disconnecting a single-acting fixture, a double-acting fixture, or a fixture with several individual clamping valves from its power source before machining
- Automatic shutoff using a pilot-operated check valve...no manual shutoff valve required!
- Compact assembly mounts easily on fixture
- Ideal for pallets and rotating fixtures where a fluid feed line is impractical
- Decoupler includes pilot-operated check valve, quick disconnects, accumulator, pressure gauge, and pressure-relief valve

POWER UNIT: A double-acting power unit with a four-button control switch (B1, B2, B3, B4) is required to use this pallet decoupler for either a single-acting fixture or a double-acting fixture. The power unit provides automatic shutoff capability, via the decoupler's pilot-operated check valve, and allows depressurizing both pressure hoses simultaneously for uncoupling. See table below for power-unit part number. This pallet decoupler can also be used where clamping is controlled by individual clamping valves on the fixture (3-way valves for single acting or 4-way valves for double acting). In that application, one constant-pressure hose and one return hose are connected to the decoupler, so any standard single-acting power unit can be used.



Female Disconnect Double Coupler

(order separately)



OPERATING SEQUENCE FOR UNCLAMPING/CLAMPING:

A) SINGLE-ACTING CYLINDERS

Operating sequence for **unclamping** with coupling for single-acting cylinders:

- 1) Remove dust cap and clean coupling parts, if necessary.
- 2) Connect coupler of quick-disconnect coupling in depressurized mode.
- 3) Open high-pressure shut-off valve.

Operating sequence for **clamping** with coupling unit for double-acting cylinders.

- 1) Coupler of quick-disconnect coupling is coupled and high-pressure shut-off valve is opened.
- 2) Actuate power unit until pressure gauge shows required clamping pressure.
- 3) Shut high-pressure shut-off valve.
- 4) Set pressure generator to unclamping position.
- 5) Disconnect coupler of quick-disconnect coupling and put into a safety support, if necessary.
- 6) Attach dust cap to coupling nipple and coupler.

B) DOUBLE-ACTING CYLINDERS

Operating sequence for **unclamping** with coupling unit for double-acting cylinders:

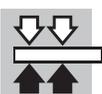
- 1) Remove dust cap and clean coupling parts, if necessary.
- 2) Connect multi-coupler in depressurized mode: For the purpose switch selector switch to "couple."
- 3) Switch selector switch to "unclamp."

Operating sequence for **clamping** with coupling unit for double-acting cylinders.

- 1) Multi-coupler is coupled.
- 2) Switch selector switch to "clamp." After pressure build up, the green lamp is signaled.
- 3) Set multi-coupler to depressurized mode: For the purpose switch selector switch to "couple."
- 4) Disconnect multi-coupler and put it into a safety support, if necessary.
- 5) Attach dust cap to coupling nipple and coupler.

SAFETY FEATURES: Pallet decouplers include an accumulator to compensate for pressure changes due to temperature variations. Important: use pallet decouplers only with Roemheld components, because all system components must be zero leakage. These decouplers are equipped with a pressure-relief valve to protect the fixture and the accumulator from extreme temperature increases. An optional safety support with a limit switch can be used to hold the double coupler after uncoupling, to ensure that the fixture is disconnected before moving.

Accumulator Size	Compact	Large
Maximum operating pressure (psi)	7250	7250
Minimum operating pressure (psi)	1800	1800
Accumulator volume at 7250 psi (cu. in.)	0.6	3.4
Accumulator volume at 1800 psi (cu. in.)	0.16	0.9
Accumulator gas preload (psi)	1450	1450
Weight (lbs)	9.6	13.5
Part No., Decoupler	CLR-9425-022-PD	CLR-9425-021-PD
Part No., Female Disconnect Double Coupler	CLR-9425-102-PDA	
Part No., Safety Support	CLR-0942-002-PDA	
Electric Power Unit, 7500 psi, 460V	CLR-939-EP	
Electric Power Unit, 7500 psi, 230V	CLR-839-EP	
Electric Power Unit, 5000 psi, 460V	CLR-940-EP	
Electric Power Unit, 5000 psi, 230V	CLR-840-EP	



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Tooling-Block Pallet Decouplers

7250 psi max
Single acting



Four-Sided

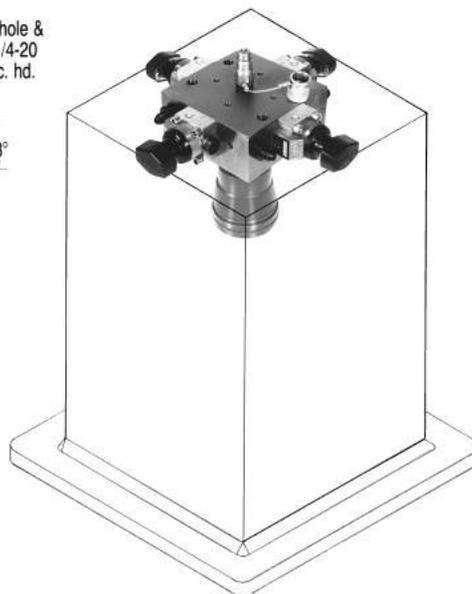
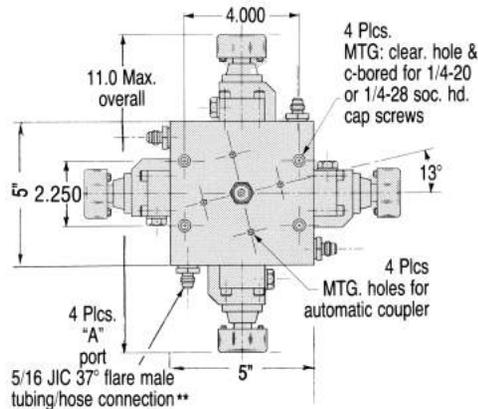
- **Extremely convenient fluid supply for multi-face pallets. Requires only one connection!**
 - **Controls each tooling-block face independently with a 3-way clamping valve**
 - **Decouples easily for machining . . . no shutoff valve required!**
 - **Complete with all valves, quick disconnect, and accumulator**
 - **Specials available for more than four faces, and for VTL fixtures. Please contact factory.**
- **Do not use NPT fittings**

OPERATION: Requires only one fluid line from the power unit to the decoupler, due to internal hydraulic circuitry. Unload and reload using one of the two sequences below. The built-in accumulator stores fluid as the fixture is pressurized.

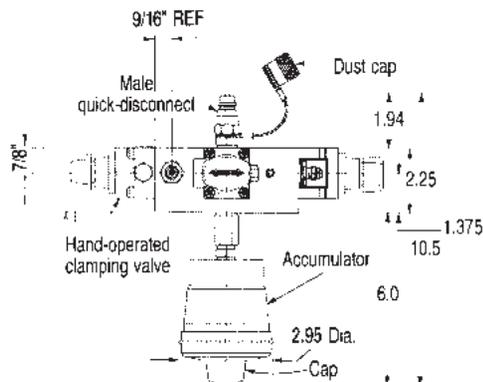
- PROCEDURE TO UNLOAD ALL FACES THEN RELOAD ALL FACES (TWO TURNS):**
1. Connect hose from power unit to the decoupler's quick disconnect (with power unit in "unclamped" position).
 2. To unload first face, turn its clamping valve to "unclamped" position, then remove part. Index and repeat for all faces.
 3. Switch power unit to "clamped" position.
 4. Load new part on first face, then turn its clamping valve to "clamped" position. Index and repeat for all faces.
 5. Switch power unit to "unclamped" position.
 6. Disconnect hose and begin machining.

MOUNTING: Mount on top of tooling block, at its rotational center. Fasten with four sockethead cap screws. Bore hole in center of block to provide clearance for accumulator. Locate power unit's push-button switch near the loading area.

DESIGN CONSIDERATIONS: Use the Pallet Decoupler only with Roemheld clamps, since all components must be leakfree. The accumulator compensates for temperature change only. We recommend installing a pressure gauge on each fixture face. Important: feed hydraulic hose from directly above pallet so that the hose cannot twist more than a few degrees, especially with short hoses. **INFO+:** If necessary, install a Rotary Coupling (pages 156-157) on the hose end opposite the pallet, carefully mounted to avoid strain. Use only heavy-duty hose (see F&A section). Fluid must be clean (10 micron or better nominal filtration).



Four-sided tooling block with a Pallet Decoupler mounted on top. Clamping valves control each face independently.



Patent pending.

Accumulator Size	Compact	Large
Maximum operating pressure (psi)	7250	7250
Minimum operating pressure (psi)	1800	1800
Accumulator volume at 7250 psi (cu. in.)	0.6	3.4
Accumulator volume at 1800 psi (cu. in.)	0.16	0.9
Accumulator gas preload (psi)	1450	1450
Weight (lbs.)	6.0	8.0
Part No., Decoupler - 4 sided	CLR-401-PD	CLR-402-PD
Part No., Decoupler - 2 sided	CLR-421-PD	CLR-422-PD
Part No., Female Disconnect	CLR-202-F	

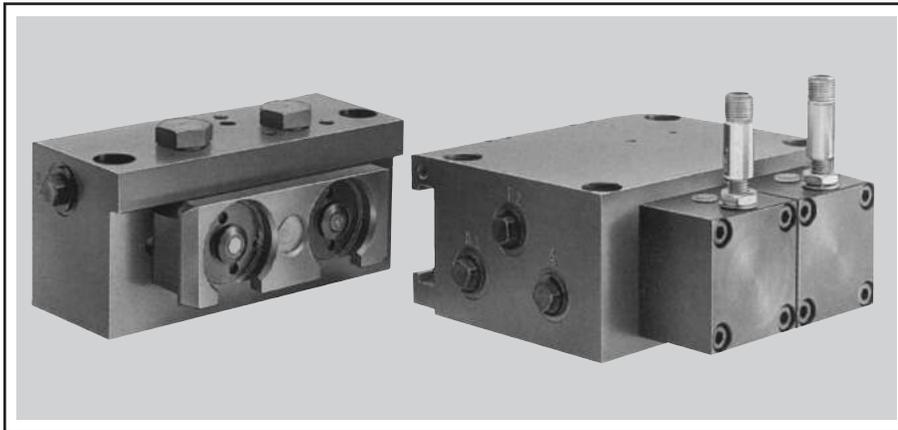


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Automatic Coupling Systems ■ F9.426



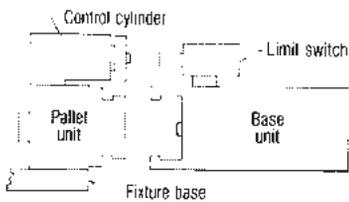
Pallet Unit and Base Unit

- State-of-the-art turnkey automatic coupling for flexible manufacturing systems
- System consists of a Pallet Unit for each pallet, a Base Unit, and a special Electric Power Unit
- Unit couples under full pressure for unclamping

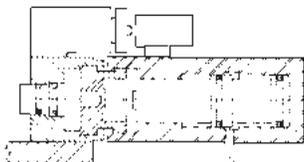
DESIGN CONSIDERATIONS: Unit automatically compensates for axial misalignment within $\pm .028$ inches. Pallet Unit and Base Unit must line up within this range. **Since all components must be leakfree, use only with Roemheld clamps.** Also, since the fixture's fluid lines are sealed after disconnection, fluid pressure will increase if fixture temperature increases (about 80 psi per 1°F). Be careful not to exceed 7250 psi at any time during the machining cycle.

SAFETY PRECAUTIONS: Mount a control cylinder on pallet unit, install a limit switch on the machine tool to check that the control cylinder's plunger is extended, indicating proper pressure. Regularly check palletized fixtures for leaks by disconnecting the accumulator or shutting it off with a shutoff valve (CLR-400-V).

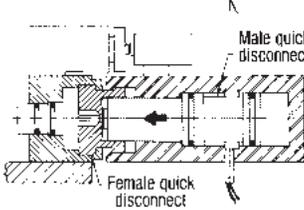
MOUNTING: Align units, then dowl in place with the holes provided. Fasten with socket-head cap screws. Mount in any position, preferably horizontal.



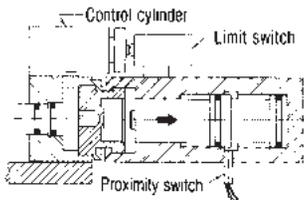
1. Units before coupling (Separated during machining operation).



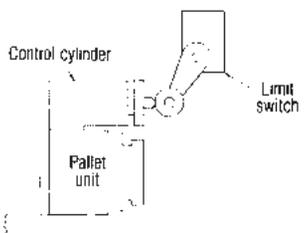
2. Slide Pallet Unit into place, ready for coupling. White indicator light indicates pallet is present.



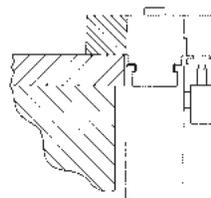
3. Press UNCLAMP button. Base unit extends male quick disconnect into female to make fluid connection. After connection, power unit automatically depressurizes fixture for unloading.



4. After loading, press CLAMP button so that power unit pressurizes fixture. Once fixture is fully pressurized (confirmed by control cylinder and external limit switch) base unit automatically retracts male quick disconnect. Internal proximity switch confirms full retraction and lights green indicator. Units are now ready to slide apart.

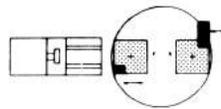


5. Once pallet is loaded on the machine table, a limit switch (or probe) mounted on the machine can monitor the fixture for full pressure using the control cylinder.

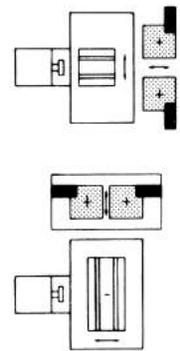


Units can also be mounted vertically.

Single Load Station



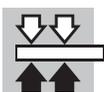
Two Load Stations (shuttle)



Part No., Control Cylinder (4350-7250 psi)	CLR-0974-000-CC
Part No., Control Cylinder (3200-5950 psi)	CLR-0974-002-CC
Part No., Control Cylinder (1400-2300 psi)	CLR-0974-003-CC
Part No., Limit Switch	CLR-0974-001-CBA

Maximum operating pressure (psi)	7250
Minimum operating pressure (psi)	1800
Part No., Pallet Unit, single acting	CLR-4606-135-CPU
Part No., Pallet Unit, double acting	CLR-4606-235-CPU
Part No., Base Unit, single acting	CLR-4606-131-CBU
Part No., Base Unit, double acting	CLR-4606-231-CBU
Part No., Electric Power Unit	See power sources section

Subject to change. For further details, including detailed dimensions and mounting instructions, visit www.clrh.com.



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Compact



Large

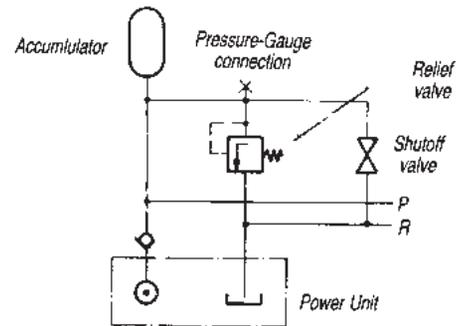
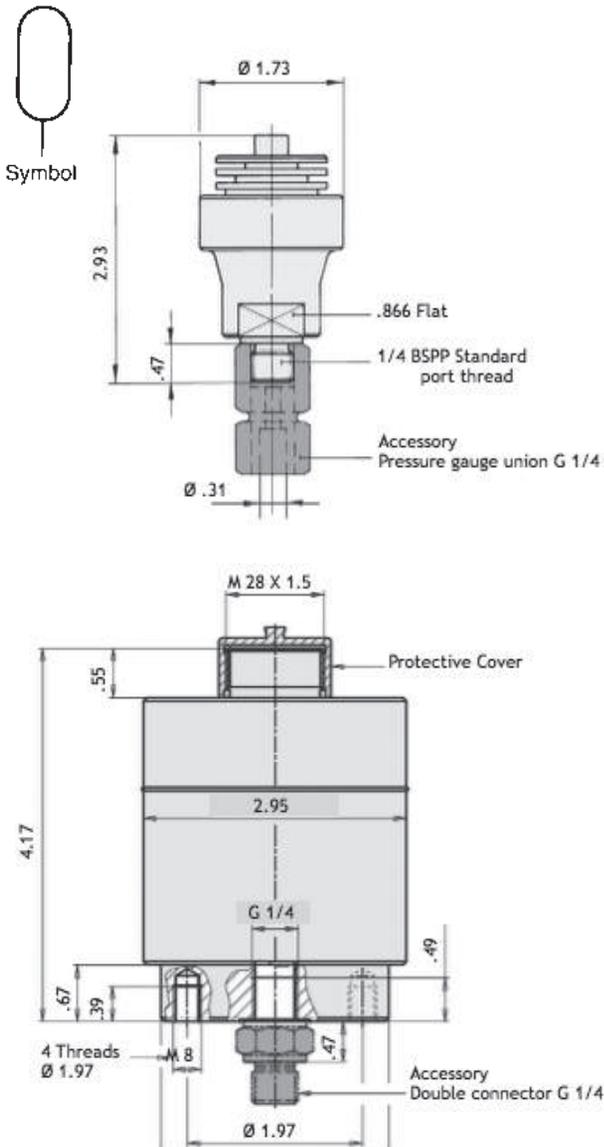
- Extremely compact accumulator, ideal for workholding applications
- Can also store fluid potential energy between working cycles
- Operates comfortably at up to 7250 psi
- Choice of large or compact size

****Do not use NPT fittings**

SPECIFICATIONS: Nitrogen-filled diaphragm type accumulator. Allowable operating temperature 15 to 175° F. Install in any position, horizontal or vertical.

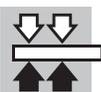
DESIGN CONSIDERATIONS:

1. Use only with Roemheld components because all system components should be leakfree.
2. Since a fixture's fluid lines are sealed after disconnection from the power source, fluid pressure will actually increase if fixture temperature increases. This increase can be quite substantial: about 80 psi per 1°F. Be careful not to exceed 7250 psi at any time during the machining cycle. Always install a pressure gauge in the closed system.
3. If the possibility of exceeding 7250 psi exists, install a Relief Valve (see valves section) in the system.
4. Shield accumulator if the possibility of accidental damage exists.



Example:
Accumulator circuit with all safety devices installed.

Size	Compact	Large
Maximum operating pressure (psi)	7250	7250
Minimum operating pressure (psi)	1800	1800
Accumulator volume at 7250 psi (cu. in.)	.60	3.4
Accumulator volume at 1800 psi (cu. in.)	.16	.9
Accumulator gas preload (psi)	1450	1450
Weight (lbs)	0.7	5.0
Part No.	CLR-9606-102-PDA	CLR-500-PDA



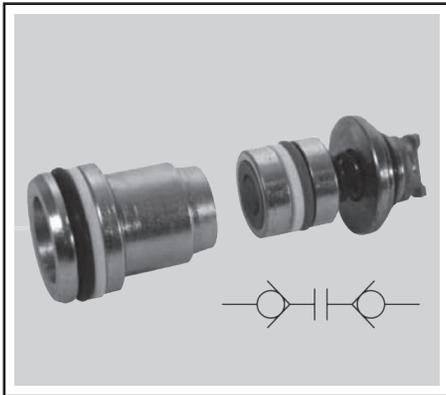
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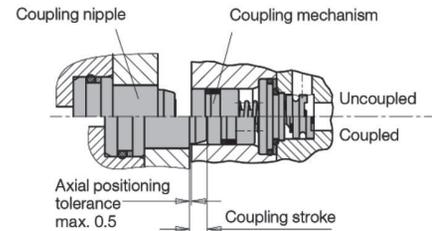
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Coupling Elements ■ Built-in & Threaded-body ■ F9.428

Coupling Elements ■ Stainless Steel, Built-in Type and Threaded Body Type
 Max. Operating Pressure ■ 4351, 5076, or 7252 psi (300, 350, or 500 bar)



Coupling situation



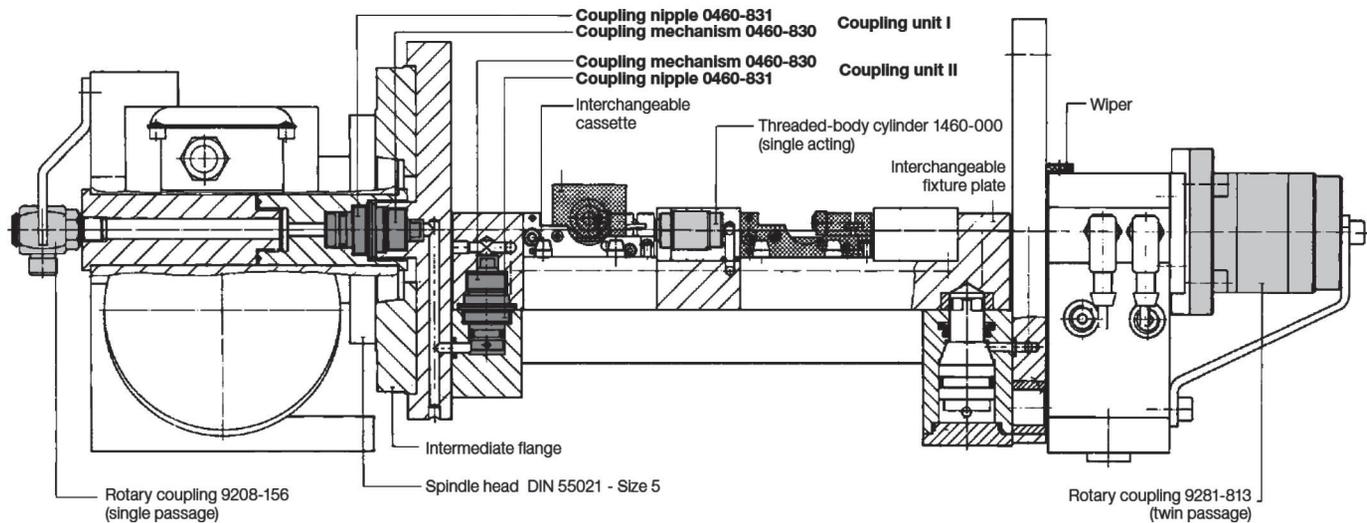
These stainless steel coupling elements allow the transfer of liquids or gases while they are coupled and are designed to maintain pressure in the uncoupled state. Some versions cannot be coupled under pressure

but there are versions available that allow coupling to occur under pressure. The built-in types are designed for mounting in between plates which allows for compact multi-coupling units like seen in data sheet F9.440. The

threaded-body types can be screwed directly into a fixture and fixture base, allowing fast and easy fixture changes.

Application example

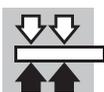
Rotary indexing table – clamping fixture, hydraulically operated, with trunnion bearing and hydraulic positioning



General technical characteristics

Type	Threaded-body	Built-in	Threaded-body	Threaded-body with nozzle	Built-in	Threaded-body	Built-in
Nominal diameter (ND)	0.118	0.118	0.197	0.197	0.197	0.315	0.315
Max. operating pressure (psi)	5076	4351	7252	7252	4351	4351	4351
Max. flow rate (gpm)	2.11	2.11	3.17	3.17	3.17	9.25	9.25
Coupling stroke (in)	0.177	0.177	0.177	0.177	0.177	0.291	0.291
Axial coupling force at 0 psi (lbs.)	18.4	18.4	15.7	15.7	15.7	13.9	13.9
Axial positioning tolerance (in.)	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Radial positioning tolerance (in.)	0.004	0.004	0.010	0.008	0.008	0.008	0.008
Radial positioning tolerance for CLR-0460-776/751 (in.)	-	-	0.020	-	-	-	-
Adm. Angular deviation (°)	1	1	1	1	1	1	1

Subject to change. For further details, including detailed dimensions and mounting instructions, visit www.clrh.com.



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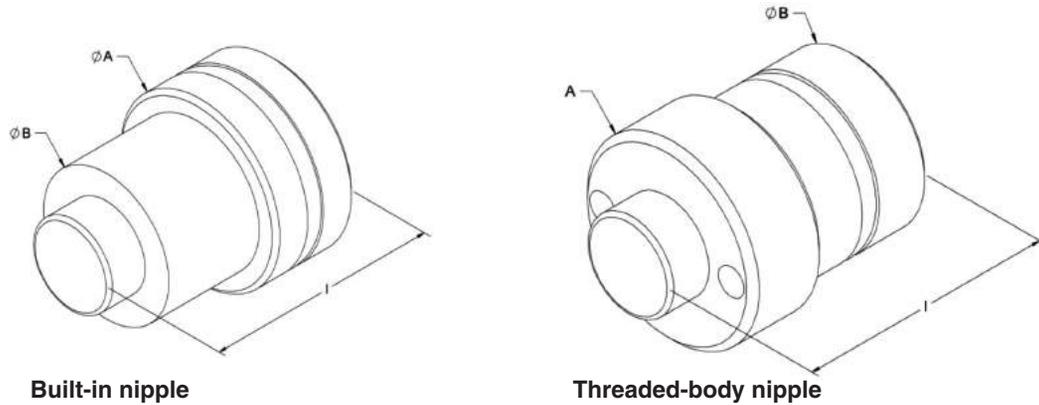
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Coupling Elements ■ Built-in & Threaded-body ■ F9.428

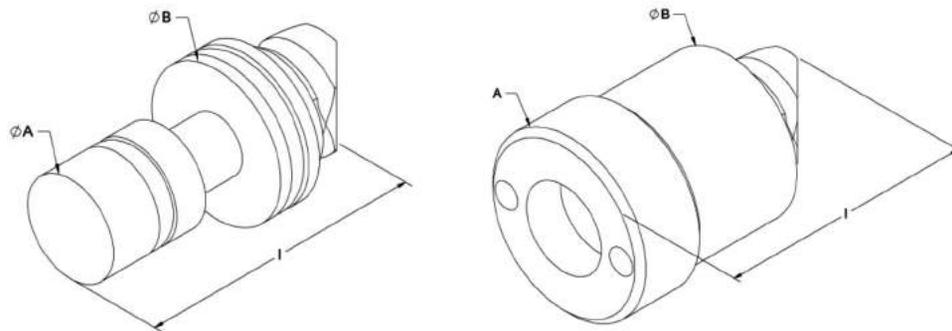
Coupling Elements ■ Built-in type and Threaded-body type

Max. Operating Pressure ■ 4350, 5075, or 7250 psi (300, 350, or 500 bar)

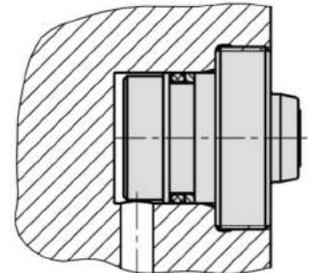


Coupling Nipples

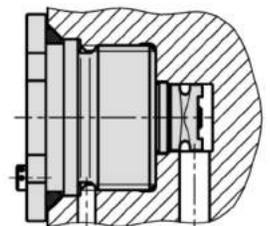
ND	3			5				8	
	Built-in	Threaded-body	Threaded-body with PV	Built-in	Built-in long	Threaded-body	Threaded-body with PV	Built-in	Threaded-body
A	0.787	M20x1.5	M20x1.5	0.787	0.787	M24x1.5	M24x1.5	0.945	M32x1.5
B	0.622	0.669	0.669	0.622	0.622	0.862	0.862	0.827	0.945
I	1.020	1.043	1.260	1.020	1.500	1.220	1.260	1.236	1.236
Part Number									
Coupling against pressure	CLR-0460-692	CLR-0460-836	-	CLR-0460-691	CLR-0460-814	CLR-0460-831	-	CLR-0460-714	CLR-0460-713
Only depressurized coupling	CLR-0460-743	CLR-0460-838	-	CLR-0460-682	CLR-0460-729	CLR-0460-751	-	CLR-0460-841	CLR-0460-772
With preloaded valve (PV)	-	-	CLR-0460-834	-	CLR-0460-837	-	CLR-0460-835	-	-
Screw-in tool	-	CLR-2010-905	CLR-2010-905	-	-	CLR-2010-904	CLR-2010-904	-	CLR-2010-903



ND 5 threaded-body type also available with integrated nozzle for air blow off



CLR-0460-703 Nipple



CLR-0460-703 Coupling Mechanism

Coupling Mechanism

ND	3		5		8	
	Threaded-body	Built-in	Threaded-body	Built-in	Threaded-body	Built-in
A	M20x1.5	0.394	M24x1.5	0.551	M32x1.5	0.748
B	0.709	0.591	0.807	0.748	1.063	0.945
I	1.150	1.150	1.150	1.150	1.732	1.732
Part Number						
Coupling against pressure	CLR-0460-832	CLR-0460-818	CLR-0460-830	CLR-0460-656	CLR-0460-711	CLR-0460-712
Only depressurized coupling	CLR-0460-833	CLR-0460-819	CLR-0460-776	CLR-0460-659	CLR-0460-771	CLR-0460-839
Additional bushing for simple location hole	CLR-0460-884	-	CLR-0460-777	-	CLR-0460-847	-
Screw-in tool	CLR-2010-905	-	CLR-2010-904	-	CLR-2010-903	-
Sealing disk (spare part)	CLR-3001-997	CLR-3001-997	CLR-3001-999	CLR-3001-999	CLR-3001-998	CLR-3001-998
Installation tool for sealing disk	-	-	CLR-0460-873	CLR-0460-873	CLR-0460-914	CLR-0460-914

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Threaded Coupling Elements

7250 psi max



Manifold Mounted

- Very compact coupling units
- Flush mounting in uncoupled mode
- Ideal for pallet coupling with vertical guided connection
- Optional return line relief
- Two sizes with and without coupling against pressure

Depending on the version, the coupling elements can either be coupled in energized mode, or de-energized mode only. The operating mode depends on the type of sealing elements which are used and can be taken from the table below.

The max. positioning tolerances in axial and radial direction are indicated in the table below.

The sealing areas at the side of the coupling elements have to be cleansed before coupling, to ensure the tightness in coupled mode. We recommend to wash the elements and finally clean them with compressed air. Dust caps should be used as far as possible.

APPLICATION: Compared to other coupling elements the threaded coupling elements are very compact devices.

If the slide movement of the workpiece carrier is to be used or if a fixture is to be used or if a fixture is to be connected to the base plate without lines, the threaded nipple and the coupling mechanisms can be directly screwed into the parts which are to be connected. The coupling mechanisms have the advantage that they are flush-faced in uncoupled mode.

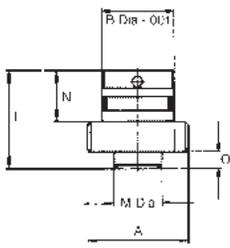
Flange-type housings are available to simplify the manufacture of the fixture mounting hole contours. In cramped conditions it is possible to make and install the flange-type housing retrospectively.

The fixture bodies which are to take up the coupling parts have to be guided .125 in. parallel before they are coupled.

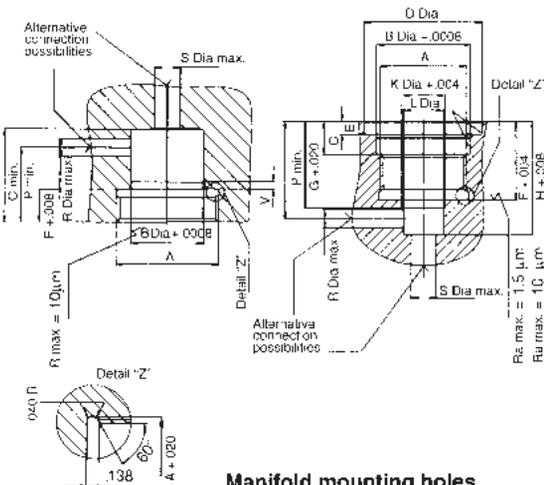
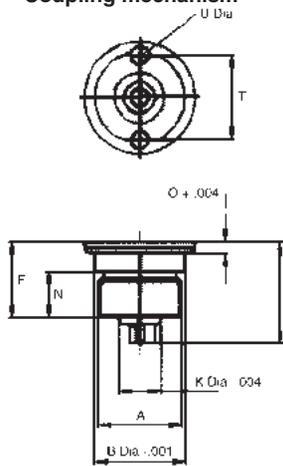
The axial forces which arise during the pressure build-up in coupled mode (see diagram) have to be absorbed outside the coupling parts.

The threaded nipples, which are installed into the tank lines, are equipped with a pre-loaded valve (VSV). The pre-loaded valve limits a possible pressure build-up in the return line, caused by internal leakage in the hydraulic clamping elements, to approx. 75 psi. In coupled mode the pre-loaded valve is not effective.

Threaded nipple



Coupling mechanism



Manifold mounting holes

Element	Coupling mechanism	Threaded nipple		Coupling mechanism	Threaded nipple	
		Threaded nipple	Threaded nipple with VSV		Threaded nipple	Threaded nipple with VSV
Nominal ID		3mm			5mm	
p. max./min.	7250/450	7250/450	7250/450	7250/450	7250/450	7250/450
A	M20x1.5	M24x1.5	M24x1.5	M24x1.5	M28x1	M28x1
B Dia	.8661	.7874	.7874	1.0236	.7874	.7874
C	.138	1.063	1.181	.354	.945	1.181
D Dia	—	—	—	1.280	—	—
E	—	—	—	.138	—	—
F	.846	.394	.394	.846	.335	.335
G	.925	—	—	.925	—	—
H	1.22	—	—	1.22	—	—
I	1.15	1.16	1.34	1.15	1.06	1.280
K Dia	.472	—	—	.472	—	—
L Dia	.441	—	—	.441	—	—
M Dia	—	.59	.268	—	.531	.531
N	.73	.65	.65	.51	.55	.77
O	—	.177	.177	.126	.177	.177
P	1.10	.827	.98	1.10	.81	.81
R Dia	.197	.197	.197	.197	.197	.197
S Dia	.276	.276	.276	.276	.276	.276
T	.630	.670	.670	.945	.787	.787
U Dia	.138	.138	.138	.197	.157	.157
V	—	2x15°	2x15°	1x15°	2x15°	2x15°
max. position tolerance (axial)	+0.020	+0.020	+0.020	+0.020	+0.020	+0.020
max. position tolerance (radial)	+/-0.004	+/-0.004	+/-0.004	+/-0.008	+/-0.008	+/-0.008

Can be coupled with or without pressure

Part No.	CLR-0460-725-TBC	CLR-0460-727-TBN	-	CLR-0460-736-TBC	CLR-0460-638-TBN	-
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Can only be coupled without pressure

Part No.	CLR-0460-730-TBC	CLR-0460-731-TBN	CLR-0460-728-TBN	CLR-0460-736-TBC	CLR-0460-740-TBN	CLR-0460-637-TBN
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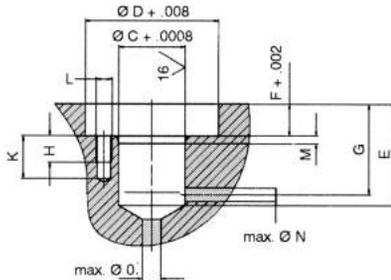
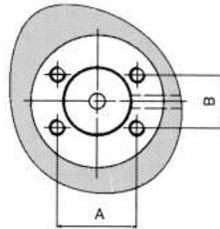
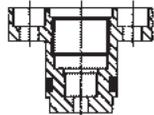
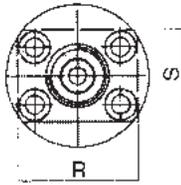


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Threaded Coupling Elements

Optional Housing for Coupling Mechanism



Mounting dimensions

If it is not required that the housing is flush-fitting with the pallet, the D dia. can be omitted.

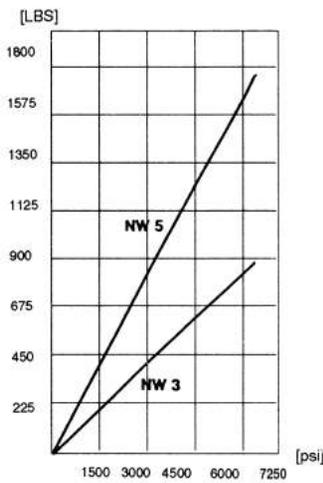
The depth dimensions are then shortened by dimension F.

In cramped installation conditions the housing can be milled according to dimensions R and S.

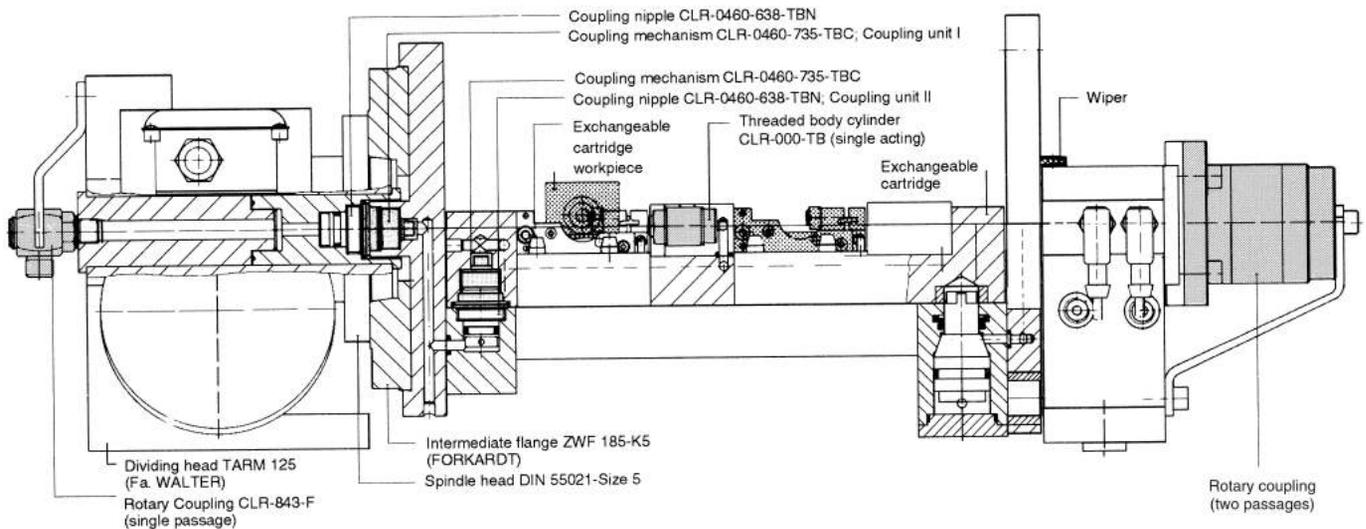
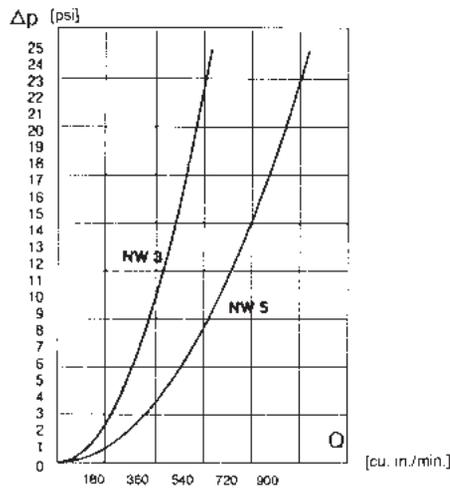
Housings for Coupling Mechanisms

Useable for	CLR-0460-725-TBC	CLR-0460-735-TBC
A	1.181	1.693
B	.787	.906
C Dia	0.9843	1.2598
D Dia	1.9685	2.5591
E	1.50	1.50
F	0.472	0.591
G min.	1.34	1.38
H	0.39	0.47
K	0.63	0.71
L	1/4-20	5/16-18
M	0.12x15°	0.12x15°
N Dia max.	0.197	0.24
P Dia	0.28	0.28
R	1.65	2.36
S	1.26	1.57
Part no.	CLR-0460-655-TBCH	CLR-0460-654-TBCH

Coupling force



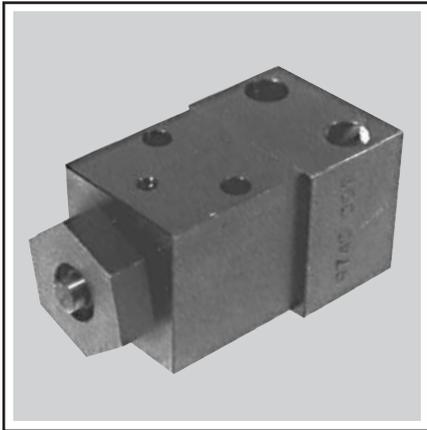
Δp -Q characteristic line for kinetic viscosity from $53 \times 10^{-6} \text{m}^2/\text{s}$



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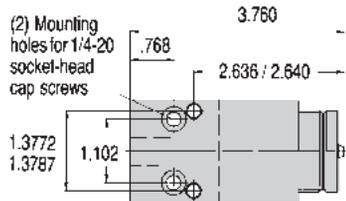


- Pressure-indicating cylinder for monitoring pressure on decoupled pallets
- Plunger extends only when you exceed the set pressure
- Choice of high, medium or low pressure-monitoring range
- Choice of standard fittings or manifold mounting

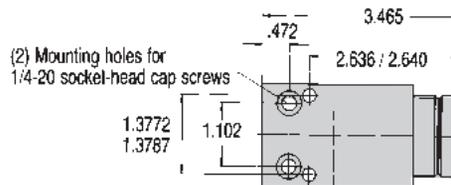
OPERATION: Unlike other clamps and cylinders, Control Cylinders do not extend immediately under low pressure. Their internal springs are calibrated to restrict plunger movement until a set pressure is reached. In fact, full plunger movement takes place entirely during a small 290 to 580 psi “switching range” (hysteresis) during which the plunger switches from fully in to fully out. By installing a limit switch fixed to the machine table, you can detect whether proper pressure is present or not.

SETTING: Select a Control Cylinder with setting range based on expected system operating pressure. Usually Control Cylinders can be set approximately 20% under full operating pressure, unless tighter control is required. For example, if maximum operating pressure will be 6000 psi, set Control Cylinder to finish retraction at 4800 psi (using either a high- or medium-range Control Cylinder). To set control pressure, turn front threaded bushing after loosening setscrew, then retighten setscrew.

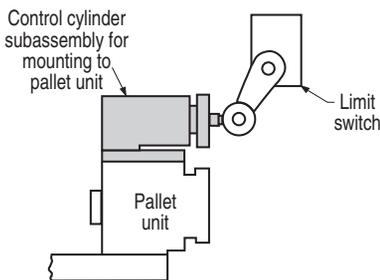
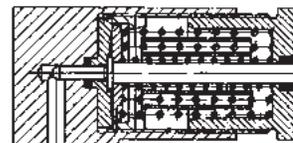
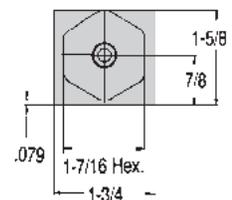
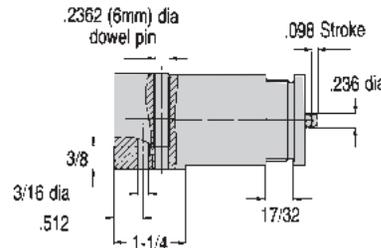
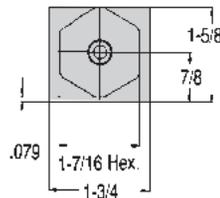
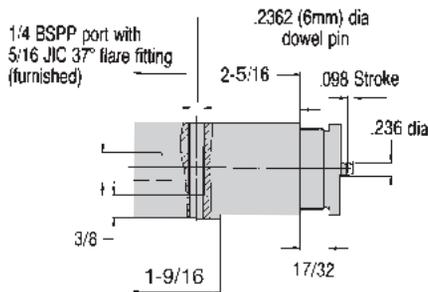
MOUNTING: Fasten with two 1/4-20 socket-head cap screws. Dowel in place with two 6mm dowel pins. To manifold mount, order O-ring CLR-3000-347-SW, and counterbore mounting surface .531 / .535 dia x .057 / .061 deep under 3/16 dia passage.



Standard Fittings



Manifold Mounting



Limit switch mounted on machine table monitors clamping pressure by sensing the extended position of the Control Cylinder's plunger. If system pressure somehow drops below the set level, the plunger would retract.

Setting range (psi)	High	Medium	Low
	4350-7250	3200-5950	1400-2300
Max. operating pressure (psi)	7250	7250	7250
Switching range (psi)	290	440	580
Stroke	.098	.098	.098
Part No., standard fittings	CLR-9740-802-CC	CLR-9740-803-CC	CLR-9740-804-CC
Part No., manifold mounted	CLR-9740-025-CC	CLR-9740-026-CC	CLR-9740-027-CC
Control Cylinder Subassembly	CLR-0974-000-CC	CLR-0974-002-CC	CLR-0974-003-CC



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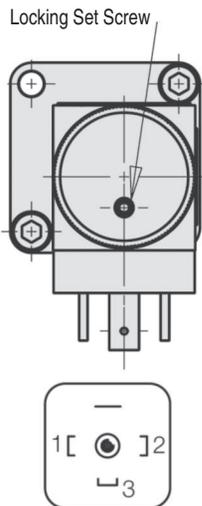
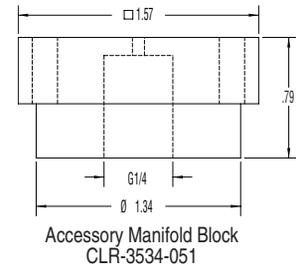
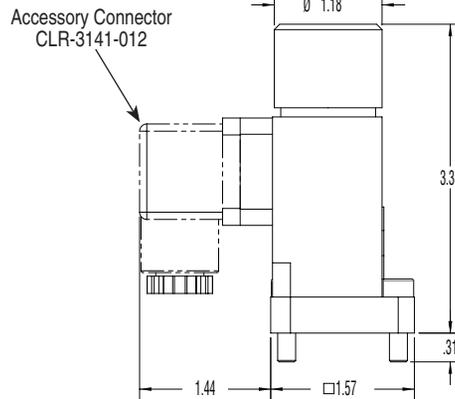
Pressure Switches ■ F9.732

Pressure Switches ■ Hydra-electrical signal converter ■ Pressure adjustment ranges ■ 75-1885 psi, 725-5075 psi & 725-7975 psi (5-130 bar, 50-350 bar & 50-550 bar)

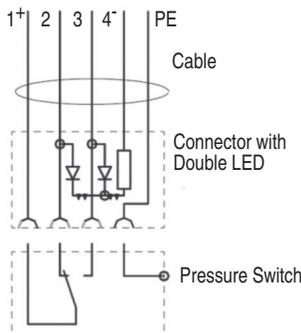


Hydra-electric pressure switches are devices which close or open electrical contacts under pressure. They are used to switch on or off pump motors, valves, machine tool interlocks or similar applications in power units, machines

and installations. The switching point can be adjusted to the desired hydraulic pressure via a knurled knob. The knob can be looked in placed by tightening a set screw. The installed microswitch is a change-over switch which can be connected as break or make contact. The electrical connector can be index 4 x 90°.



Contact Layout



Switching Symbol Connector with Double LED CLR-3141-802

Hydraulic characteristics

Pressure adjustment range	725 - 7975 psi	725 - 5075 psi	75 - 1885 psi
Hysteresis	8 - 12% at 7250 - 3625 psi	8 - 12% at 4350 - 1450 psi	8 - 12% at 1450 - 435 psi
Part No., (switch only)	CLR-9730-500	CLR-9730-501	CLR-9730-502
Part No., (switch + CLR-3141-012 DIN connector)	CLR-9730-500-PS	CLR-9730-501-PS	CLR-9730-502-PS

Electrical characteristics

Connection	DIN 43650 connector, form A
Switching element	Change-over switch
Max. load	4A at 250VAC; max 3.0A at 28VDC; min. 5mA
Code class (ED 60529)	IP 65

Technical characteristics

Operating fluid	Hydraulic oil HLP 22, 32 and 46
Fluid temperature	max. 176 °F
Fluid connection	Manifold mounting or G1/4 with manifold block
Environmental temp.	-50 °F - 176 °F
Max. operating pressure	8700 psi
Vibration resistance	10 g (10 - 2000 Hz)
Shock resistance	30 g
Material	Housing: zinc diecasting Adjusting knob: aluminum (powder coated)
Seals	FKM
Weight	0.72 lbs
Mounting position	Any

Accessories

Part No., Manifold block	CLR-3534-051
Part No., Connector DIN 43650, 4 x 90° indexable	CLR-3141-012
Part No., Connector with 1.97' cable	CLR-3141-928
Part No., Connector with 8.2' cable	CLR-3141-818
Part No., Connector with double LED and 9.84' cable	CLR-3141-802
Part No., Spare FKM O-ring	CLR-3001-147

Subject to change. For further details, including detailed dimensions and mounting instructions, visit www.clrh.com.

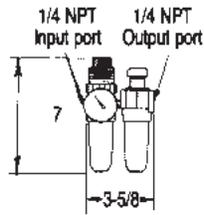


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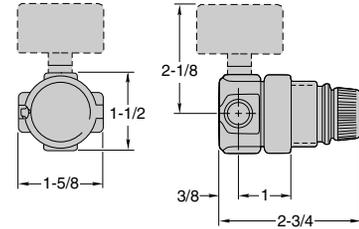
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Air Filter/Regulator/Lubricator



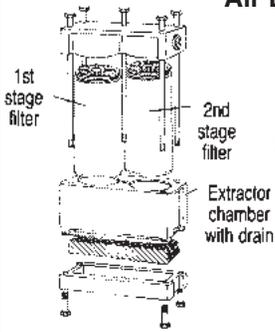
CLR-100-FRL
Recommended for all incoming air-pressure lines (included with air power unit). Filter removes solid contaminants and water from the air supply. Lubricator provides an oil mist to lubricate the system. Regulator is essential to control input air pressure, and thereby control output fluid pressure.

Fine Air-Pressure Regulator



CLR-200-FR
Miniature regulator for adjusting air pressure between 1 and 10 psi (30 psi gauge). Use with air-advanced work supports to finely adjust contact force. 1/4 NPT ports.

Air Extractor/Dryer



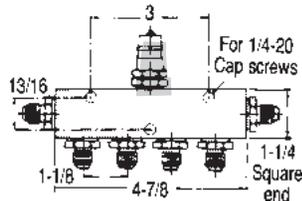
CLR-105F-AED
Effective extractor/dryer that removes air moisture and dirt to increase the life of air-powered components. Replace or clean 1st-stage filter yearly (part no. CLR-401-AEDA, black) Replace 2nd-stage filter every 4-6 months (part no. CLR-403-AEDA, red).

Air Flow-Control Valve



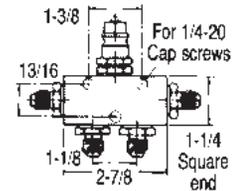
CLR-100-AFC
Simple valve to reduce air flow rates and reduce clamping speed. Release air pressure to adjust setting.

Fluid 6-Port Manifolds



CLR-106-F
(6) Male 37° fittings (1) Male quick disconnect
CLR-107-F
(7) Male 37° fittings
CLR-106-BP
(7) 1/4 BSPP ports, without fittings

Fluid 4-Port Manifolds



CLR-104-F
(4) Male 37° fittings (1) Male quick disconnect
CLR-105-F
(5) Male 37° fittings
CLR-104-BP
(5) 1/4 BSPP ports, without fittings

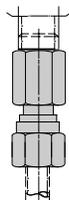
Fluid Pressure Gauges



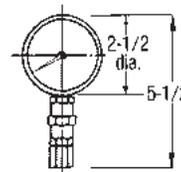
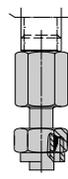
CLR-100-GA
Gauge only without adaptor



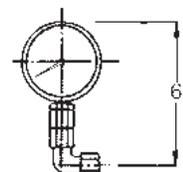
CLR-808-F
Female gauge adaptor Compression type



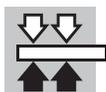
CLR-9208-041-F
Male gauge adaptor Compression type



CLR-101-GA
Gauge with Female 37° fitting



CLR-102-GA
Gauge with Elbow Female 37° fitting

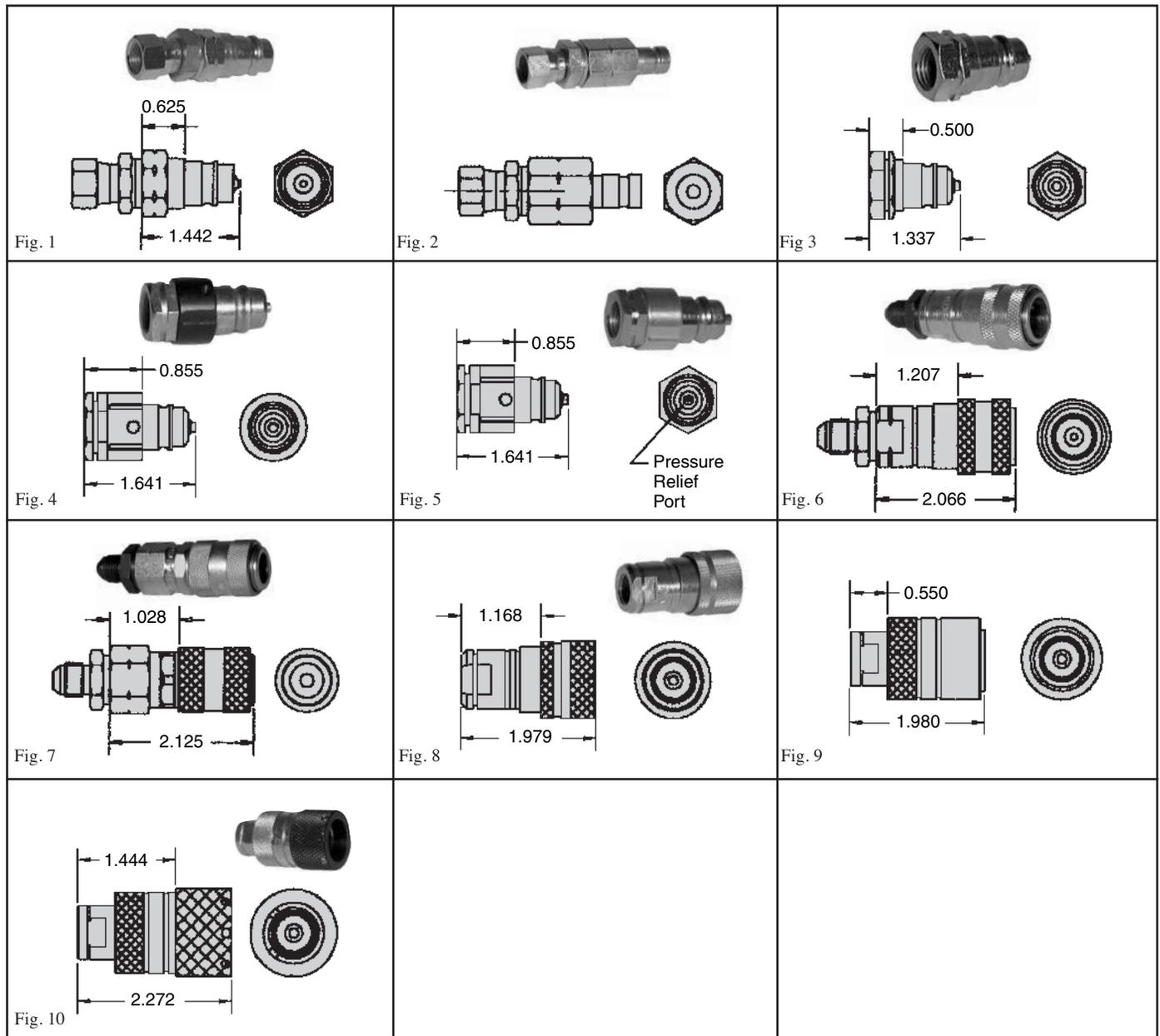


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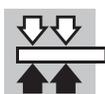
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Quick Disconnects



Part No.	Figure	Comments	Compatibility
CLR-200-F	Fig #1	Standard Nipple	Fig #6
CLR-202-F	Fig #6	Pull Coupler Sleeve Back Insert On Nipple and Release. Reverse Action To Uncouple.	Fig #1
CLR-220-F	Fig #2	Non-Spill Nipple	Fig #7
CLR-222-F	Fig #7	Coupling - Hold Stem of Coupler and Push, To Uncouple Pull Back Sleeve.	Fig #2
CLR-9384-206-F	Fig #3	Heavy Duty Nipple	Fig #9
CLR-9384-100-F	Fig #8	Pull Coupler Sleeve Back Insert on Nipple and Release. Reverse Action To Uncouple.	Fig #3
CLR-9384-106-F	Fig #9	Push Coupler Sleeve on Nipple and Release. Reverse Action To Uncouple.	Fig #3
CLR-9384-7x7-F	Fig #4	* Color Coded Nipple with Alignment Pin Slots	Fig #10
CLR-9384-7x6-F	Fig #10	* Match Color and Alignment Pins. Pull Coupler Sleeve Back Insert on Nipple & Release. Reverse Action to Uncouple.	Fig #4 & 5
CLR-9384-727-F	Fig #5	White Coded Nipple with Alignment Pin Slots & VSV Valve	Fig #10

* Reference "X" in part number: 1 = Black, 2 = White, 3 = Red, 4 = Yellow, 5 = Green, 6 = Blue



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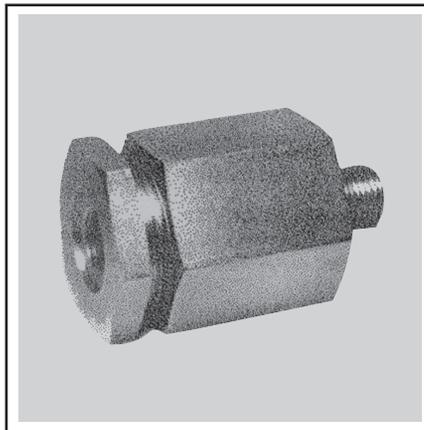
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High Pressure Inline Filters

7250/3000 psi max



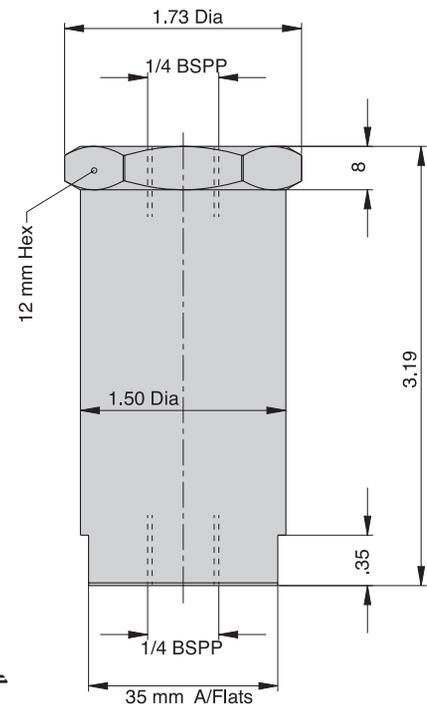
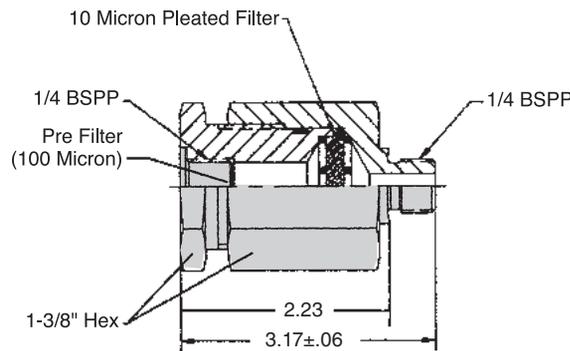
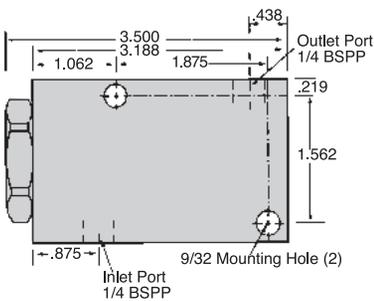
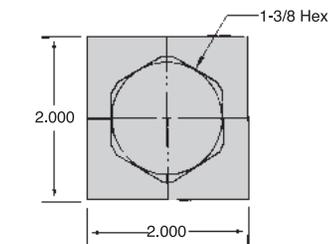
CLR-000-V



CLR-100-V



CLR-3887-087



- Replaceable filter elements
- Simple and compact in design
- Easy to install on any new or existing system
- Do not use NPT fittings

OPERATION: Install the filter in the output line of the pump to provide filtration of the oil entering the system. The oil passes through the filter assembly from inlet port to outlet port.

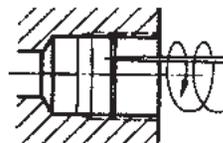
CAUTION: Do not attempt to replace filter element with pressure in system.

Recommended mounting position is with filter body vertical, plug on the bottom. This mounting position allows contaminated filter elements to be changed without removing existing piping or tubing. Simply remove the end plug, spring, and spring retainer to get at the filter element.

CAUTION: Mounting position other than as recommended...remove entire filter assembly for servicing.



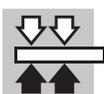
Pre Filter (100 micron)



Pre Filter Installations

Max. Oper. Pressure (psi)	7250	7250	5000
Filter Rating (Nom. Filtration)	10 microns	10 microns	10 microns
Typical Flow Rate (cu. in./min.)	120*	230	120
Direction of Flow	Either direction	Either direction	Either direction
Material (Body)	Steel	Steel	Steel
Weight (lbs)	3	.75	1
Part No.	CLR-000-V	CLR-100-V	CLR-3887-087
Part No. of Filter Element	CLR-001-FIL	CLR-100-FIL	CLR-3887-061-FIL
Part No. of Pre-Filter	—	CLR-3887-009-FIL	—

*AP 35 psi across filter



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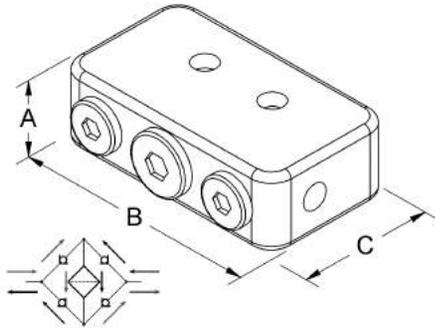
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Filters ■ High Pressure Filter ■ F9.500

Hydraulic Filters ■ Stainless steel and steel

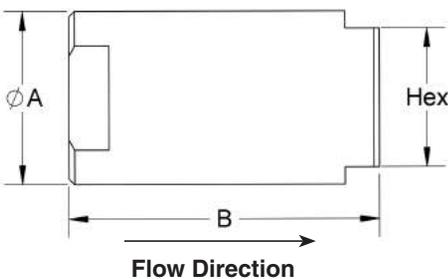
Max. Operating Pressure ■ 5075 psi (350 bar) and 7250 psi (500 bar)



- Suitable for large flow rates
- Filter insert can be cleaned
- Insert removal without dismantle
- Connections: fitting or manifold mount
- Flow direction variable
- Unique rectifier function, allows oil to be filtered going to and from pump in a single direction

Technical characteristic with rectifier function

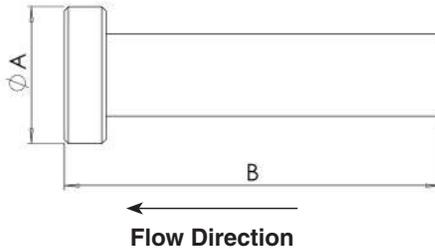
Max. operating pressure	5075 psi
Filter Capacity	10 μ
Filter material	Stainless steel
Body material	Stainless steel
A (in.)	1.18
B (in.)	4.21
C (in.)	2.36
Part No.	CLR-3887-086



- Suitable for large flow rates
- Filter insert can be cleaned
- Water option
- Replacement filter inserts available

Technical characteristic cartridge style filters

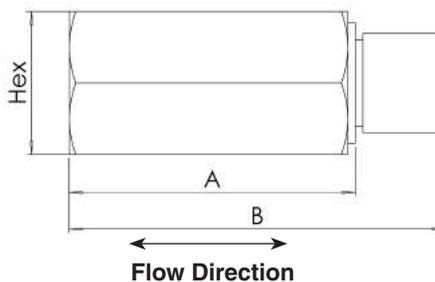
Max. operating pressure	5075 psi
Filter Capacity	10 μ
Filter material	Stainless steel
Body material	Stainless steel
Hex (in.)	0.94
Ø A (in.)	1.18
B (in.)	2.13
Part No.	CLR-3887-067
Part No., Compact	CLR-3887-087



- Minimal dimensions
- For installation in drilled channels and plates, thereby direct protection of the hydraulic components

Technical characteristic of plug in filters

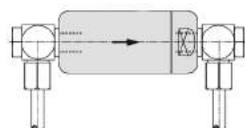
Max. operating pressure	5075 psi
Filter Capacity	10 μ
Filter material	Stainless steel
Body material	Stainless steel
Ø A (in.)	0.26
B (in.)	0.71
Part No.	CLR-3887-066
Part No.	CLR-3887-071



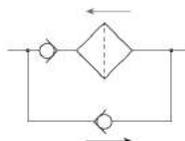
- For installation in front of couplings
- Protection against swarf
- Up to 7250 psi operating pressure
- Flow direction variable

Technical characteristic high pressure filters

Max. operating pressure	7250 psi
Filter Capacity	100 μ
Filter material	Steel
Body material	Steel, galvanized
Hex (in.)	0.75
A (in.)	1.50
B (in.)	1.97
Part No.	CLR-3887-030



Installation example for simple change of the filter



Switching example with passage and filtering in one direction

Subject to change. For further details, including detailed dimensions and mounting instructions, visit www.clrh.com.



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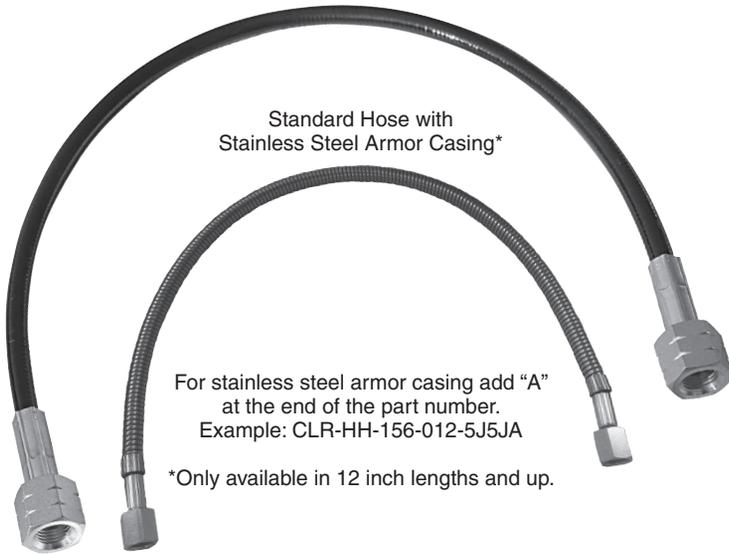
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Accessories

Fixture Hose

Standard Hose

Standard Hose with
Stainless Steel Armor Casing*



For stainless steel armor casing add "A"
at the end of the part number.
Example: CLR-HH-156-012-5J5JA

*Only available in 12 inch lengths and up.

Small-Diameter high-pressure hose perfect for workholding applications. Abrasion and chemical resistant outer cover with seamless nylon inner sleeve reinforced with synthetic yarn. Other lengths and diameters available upon request.

Nominal ID	0.156 in
Nominal OD	0.34 in
Min. bend radius	1.6 in
Burst pressure	25,520 psi
Temperature range	-40 to +150°F

Length	End Type
	#5 JIC
Part No., 9 inch	CLR-HH-156-009-5J5J
Part No., 12 inch	CLR-HH-156-012-5J5J
Part No., 15 inch	CLR-HH-156-015-5J5J
Part No., 18 inch	CLR-HH-156-018-5J5J
Part No., 24 inch	CLR-HH-156-024-5J5J

Tubing

Heavy-Duty Hose

Hydraulic Fluid

Seamless heavy-wall tubing. C1010 steel, cold drawn, fully annealed. 5/16" OD, .065" wall thickness, 22,800 psi burst pressure. Do not use any other type of tubing. See next page for installation guidelines and tools (CLR-300-TL flaring tool is strongly recommended).

60" CLR-60-T



High-pressure hydraulic hose. 1/4" inside diameter. Reinforced with four plies of high-tensile wire, for remarkably little expansion under pressure. Fluid required due to expansion is only .066 cu. in. per foot at 7500 psi. 5" minimum bend radius. Two female ends, 5/16 JIC 37° flare, or straight tube ends for use with compression fittings.

NOTE! 10'-0" MAXIMUM
RECOMMENDED LENGTH

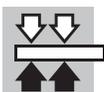
	JIC 37° flare	Compression Type
18"	CLR-18-H	CLR-18-H-CC
24"	CLR-24-H	CLR-24-H-CC
30"	CLR-30-H	CLR-30-H-CC
36"	CLR-36-H	CLR-36-H-CC
42"	CLR-42-H	CLR-42-H-CC
48"	CLR-48-H	CLR-48-H-CC
60"	CLR-60-H	CLR-60-H-CC
72"	CLR-72-H	CLR-72-H-CC

(Special lengths available)



As per DIN 51524, HLP. Contains special additives for proper lubrication and corrosion protection. Use only SWIFTSURE fluid or an exact equivalent HLP 22: Shell Tellus® 22, Mobil DTE 22, or Chevron Hydraulic Oil AW ISO 22. **Fluid must be clean (10 micron or better nominal filtration) See also high pressure in-line filters.**

2 gal. CLR-2-FL



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Tubing Installation



**CLR-100-TL
Tubing Cutter**

Cutting

1. Use only steel tubing as specified on the previous page.
2. Cut tubing with a tubing cutter or hacksaw.
3. File or sand tubing end square. End must be square to achieve a proper flare.



**CLR-200-TL
Deburring Tool**

Deburring and Cleaning

1. Deburr both ID and OD with deburring tool.
2. Clean with solvent to remove chips, dirt and rust-preventative coating. Blow clean with an air line.



**CLR-400-TL
Tubing Bender**

Bending

Tools required:

- Tube bender (3/4" radius)
- Vise

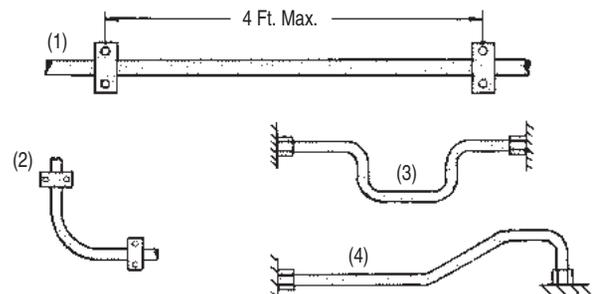
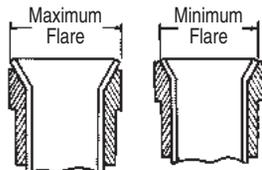
The **Roemheld** tube bender shown is a simple, effective bender we highly recommend. When bending tubing carefully avoid wrinkling, flattening or kinking the tube. Please note: complete flaring before bending.



**CLR-300-TL
Flaring Tool**

Flaring

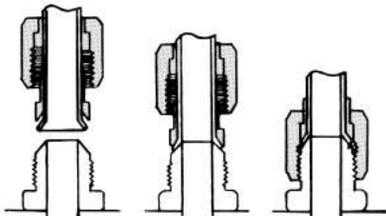
1. Place nut and sleeve over tube before flaring.
2. Place tube in flaring tool, approximately 1/8" above top of block.
3. Clamp assembled block in vise.
4. Center pin guide of flaring tool in tube.
5. Strike flaring tool 3-4 times with sharp hammer blow. Remove from block.
6. Inspect flare so that their outside diameters extend beyond the inner lip of the sleeve, but not beyond the sleeve's OD.



Installation

We recommend using tubing clamps as this will increase the life of the installation. Tubing clamps should be less than four feet apart (Figure 1) and bends should be supported also (Figure 2). Use bends as shown in Figures 3 and 4 instead of straight-line connections to prevent stressing the tubing.

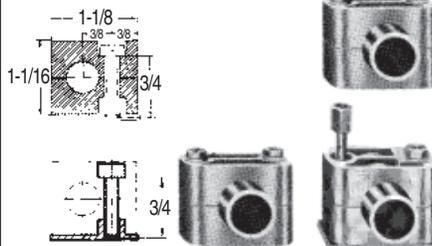
Important: Never use tubing lines as handles to lift fixtures.



Assembly

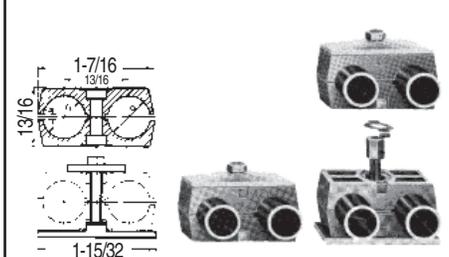
1. Slide nut and sleeve on to flared tubing end and finger tighten.
2. Finish tightening with a wrench, 1/4 to 1/2 turn.

Note: Do not over torque.



**Single Tube
Regular and Stack Mounting**

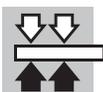
- CLR-3300-892-TA Single clamp
- CLR-3300-600-TA Single mounting plate
- CLR-3300-225-TA Mounting screw
- CLR-3300-604-TA Stack-mounting screw
- CLR-3300-335-TA Stack-mounting clip



**Twin Tubes
Regular and Stack Mounting**

- CLR-3300-891-TA Twin clamp
- CLR-3300-607-TA Twin mounting plate
- CLR-3300-609-TA Washer
- CLR-3300-225-TA Mounting screw
- CLR-3300-613-TA Stack-mounting screw
- CLR-3300-615-TA Stack-mounting clip

Subject to change. For further details, including detailed dimensions and mounting instructions, visit www.clrh.com.



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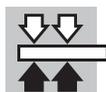
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Fittings

Hydraulic Compression Fittings (7250 psi static)											
Port Fitting - Male			Banjo Elbow			Branch Tee			Union		
											
5/16 Tubing	G 1/4	CLR-802-F				5/16 Tubing	G 1/4	CLR-804-F	5/16 Tubing CLR-701-F 1/4 Tubing CLR-721-F		
	G 1/8	CLR-805-F				5/16 Tubing	G 1/4	CLR-803-F			1/4 Tubing
1/4 Tubing	G 1/4	CLR-806-F	1/4 Tubing	G 1/4	CLR-823-F**	1/4 Tubing	G 1/4	CLR-824-F			
	G 1/8	CLR-826-F				Cross			Stand Pipe Union		
Elbow			Tee			Cross			Stand Pipe Union		
											
5/16 Tubing	CLR-702-F		5/16 Tubing	CLR-703-F		5/16 Tubing	CLR-704-F		5/16 Tubing G 1/4 CLR-9208-018-F 1/4 Tubing		
1/4 Tubing	CLR-722-F*		1/4 Tubing	CLR-723-F*		1/4 Tubing	CLR-724-F*				
Nut			Sleeve			Tube Adaptor			Port Reducer		
											
5/16 Tubing	CLR-800-F		5/16 Tube	CLR-801-F		1/4 tube to 5/16 tube		CLR-606-F		G1/4 to G1/8	CLR-3613-003-F
1/4 Tubing	CLR-820-F		1/4 Tube	CLR-821-F						G1/2 to G1/4	CLR-3613-015-F
Air-Vent Fittings 250 psi air											
Barbed for 3/16 ID Hose			Barbed for 1/4 ID Hose			Vent Fitting			Vent Fitting - Metal Filter		
											
M5 Port CLR-805-AF G1/4 Port CLR-815-AF			M5 Port CLR-3890-091-AF			G1/4 Port CLR-817-AF			G1/8 Port CLR-0361-012-F		
			G1/8 Port CLR-806-AF						G1/4 Port CLR-0361-000-F		
			G1/4 Port CLR-3890-093-AF						G1/2 Port CLR-0361-006-F		

*Max 6600 psi

**Max 6000 psi



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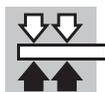
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Fittings

Hydraulic 37° Flare Fittings (7250 psi static)											
Tube End			Nut Elbow			Branch Tee			Run Tee		
											
5/16 Tubing	CLR-400-F		5/16 Tubing	CLR-402-F		5/16 Tubing	CLR-403-F		5/16 Tubing	CLR-404-F	
1/4 Tubing	CLR-420-F		1/4 Tubing	CLR-422-F		1/4 Tubing	CLR-423-F		1/4 Tubing	CLR-424-F	
Union			Elbow			Tee			Cross		
											
Male											
											
Female (1.75 in. Flare to Flare)											
5/16 Tubing	Male	CLR-301-F	5/16 Tubing	CLR-302-F		5/16 Tubing	CLR-303-F		5/16 Tubing	CLR-304-F	
1/4 Tubing	Male	CLR-321-F	1/4 Tubing	CLR-322-F		1/4 Tubing	CLR-323-F		1/4 Tubing	CLR-324-F	
5/16 Tubing	Female	CLR-401-F									
1/4 Tubing	Female	CLR-421-F									
Cap			Port Fitting Female			Tube Plug			Nut 45		
											
5/16 Tubing	CLR-501-F		5/16 Tubing	CLR-813-F*		5/16 Tubing	CLR-502-F		5/16 Tubing	CLR-406-F	
1/4 Tubing	CLR-521-F		1/4 Tubing	CLR-815-F*		1/4 Tubing	CLR-522-F		1/4 Tubing	CLR-426-F	
Banjo Elbow			Port Fitting Male			Port Plug			Double Port		
											
			5/16 Tubing	G 1/4	CLR-807-F	G 1/8 Port	CLR-3610-263				
			5/16 Tubing	G 1/8	CLR-903-F	G 1/4 Port	CLR-810-F				
5/16 Tubing	CLR-814-F		1/4 Tubing	G 1/4	CLR-816-F*	G 1/2 Port	CLR-3610-000-F		G 1/4 Port	CLR-809-F	

*Max. 6600 psi.



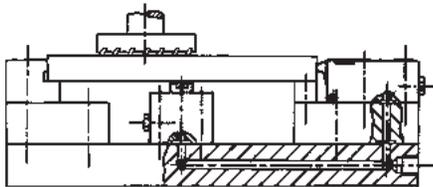
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Manifold Mounting

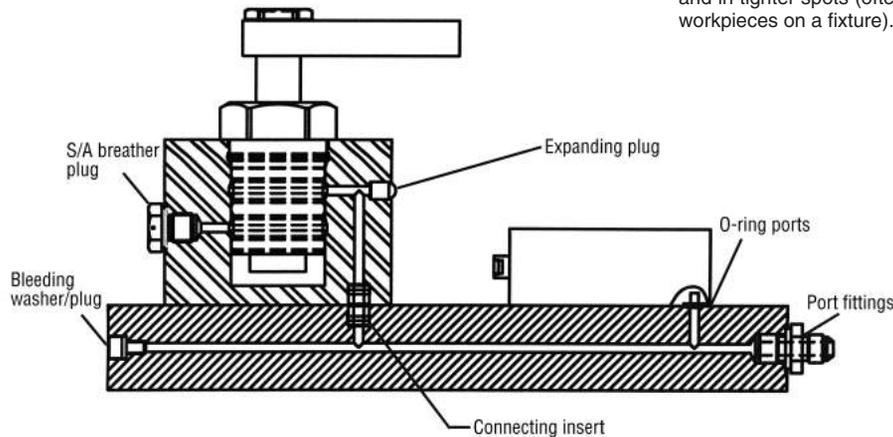
Benefits



- Eliminates tubing or hoses from working area
- Very close mounting of clamps
- Only one fluid feed line
- No traps for chips due to "clean" design
- Do not use NPT fittings

Many Roemheld components can be manifold mounted... powered directly through fluid passages drilled in a fixture. This unique mounting capability eliminates tubing and hoses in the working area, for clean fixtures without chip traps. Even fluid passages longer than your drilling capacity are possible by drilling shorter passages in separate blocks, then connecting them using connecting inserts.

Perhaps most important, manifold mounting lets you put clamps and work supports closer together and in tighter spots (often letting you place more workpieces on a fixture).

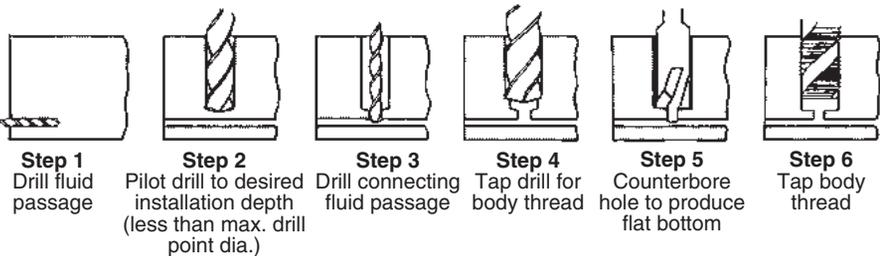


Installation Steps

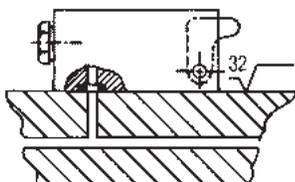
For easiest installation, we recommend the following procedure (Step 1 through 6). For proper sealing, the tapped hole's bottom must be flat, with a surface finish 125 RMS or better, and perpendicular to the hole's axis. A small drill-point is allowable (see component's catalog page for dimensions). A delrin sealing washer for the hole bottom is furnished with each component. **Do not use sealing compound or teflon tape.** Part numbers to order bottoming taps:

- 1-1/4 — 16 CLR-512-TL
- 1-1/2 — 16 CLR-515-TL
- 1-7/8 — 16 CLR-518-TL

Installing Threaded Body Components



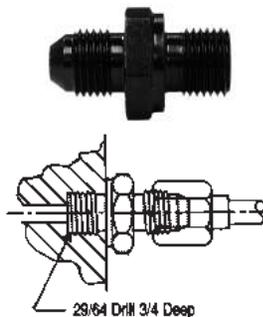
Installing Components with O-Ring Ports



Mounting surface should be ground flat with a 32 RMS or better surface finish, so that the O-ring seals properly. Torque mounting screws evenly. **Do not use sealing compound or teflon tape.**

Order Extending Clamps, Swing Clamps, and Sequence Valves by a different part number for manifold mounting (O-rings are included, and no port plugs are needed). Edge Clamps and Block Work Supports are easily converted to manifold mounting (order o-ring CLR-3000-343-SW and CLR-810-F port plug).

Port Fittings



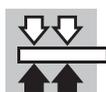
CLR-807-F
1/4 BSPP Port Fitting

Standard port fitting found in virtually all Roemheld components. To use for custom manifolds, order special bottoming tap for installation, part number CLR-514-TL. Drill, tap (5/8-inch minimum depth) and spotface. **Do not use sealing compound or teflon tape.**

CLR-902-F
1/2-20 Port Fitting

Port fitting for custom manifolds. Install using a standard 1/2-20 tap. Drill, tap (5/8-inch minimum depth) and spotface. **Do not use sealing compound or teflon tape.**

1/4 BSPP THDS - 5/8 Deep



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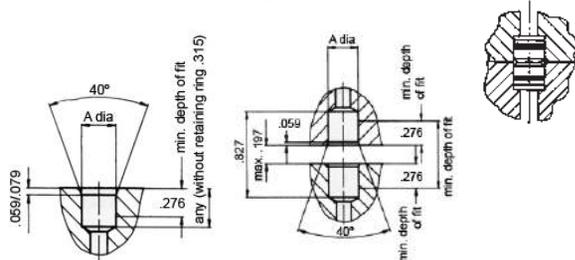
Manifold Mounting

Benefits



Connecting Plates Together

Connecting Inserts are used to provide a leak-free connection when a fluid passage goes through two separate sections of a fixture. The insert has two O-ring seals to provide leak-free sealing. Choice of two insert lengths: short (for flush connections) and long (for connections with a gap of up to .197"). Do not use sealing compound or teflon tape. Made from steel, with FKM O-rings. **For removable plates consider flush faced coupling elements CLR-0460-735-TBC and CLR-0460-638-TBN.**

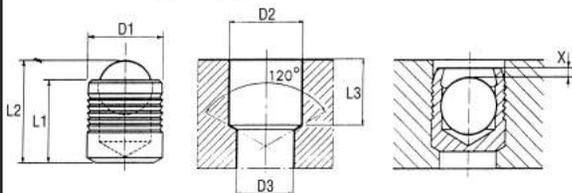


Type	Short	Long-Metric	Long-USA
Max. operating pressure	7250 psi	7250 psi	7250 psi
A dia.	.3937/.3943	.3937/.3943	.3750/.3756
Insert length	.551	.748	.748
Max. misalignment of holes	.002	.004	.004
Part No.	CLR-9210-132	CLR-9210-127-F	CLR-901-F

Plugging Drilled Passages



Expanding Plugs are used to plug the end of an oil channel. Each plug consists of a ball mounted into a sleeve which, when installed, expands and seals to the inner bore of the hole. Installation consists of preparing the hole, inserting the plug, and striking the ball to expand the sleeve. Do not use sealing compound or tape. Please consider using bleed screws instead of expanding plugs in some holes. This allows bleeding of the drilled channels.

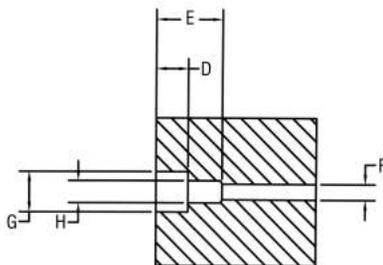


Size	1	2	3
D1	.236	.315	.394
D2 +0.004, -0.0	.236	.315	.394
D3 max.	.208	.291	.37
L1	.256	.335	.433
L2	.339	.461	.598
L3 min.	.248	.327	.425
X +/-0.008	.016	.012	.016
Part No.	CLR-916-F	CLR-906-F	CLR-926-F
Installation Tool for Expanding Plug	CLR-HT-MBM-060	CLR-HT-MBM-080	CLR-HT-MBM-100

Hydraulic Bleeding



Some drilled oil passages should have the ability to be opened for fixture bleeding. By using a sealing washer and plug, air in oil passages can be released. This is only recommended for small holes. Larger holes should be prepared to accept larger threaded plugs like CLR-810-F.



Size	1	2
D	.197	.276
E	.404	.67
F	.16	.24
G	.325	.441
H	M4	M6
Part No., Washer	CLR-3001-713-F	CLR-3000-779
Part No., Bolt	CLR-3300-357-F	CLR-3300-223-F

Air Venting - Single Acting Elements



When using Single Acting cylinders or work supports, it is important to vent the spring volume to a clean environment. If this is not done, coolant and chips can be sucked into the element during the return stroke.

Port size	G 1/8	G 1/4	G 1/2
Part No., Filter Plug	CLR-0361-012-F	CLR-0361-000-F	CLR-0361-006-F

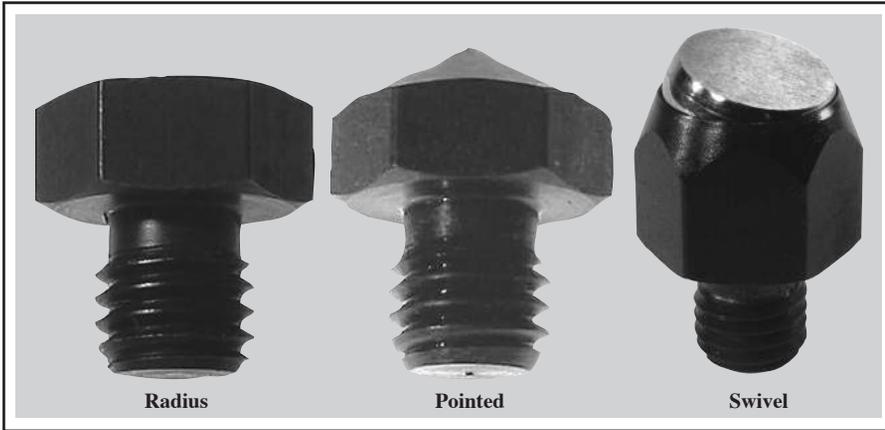


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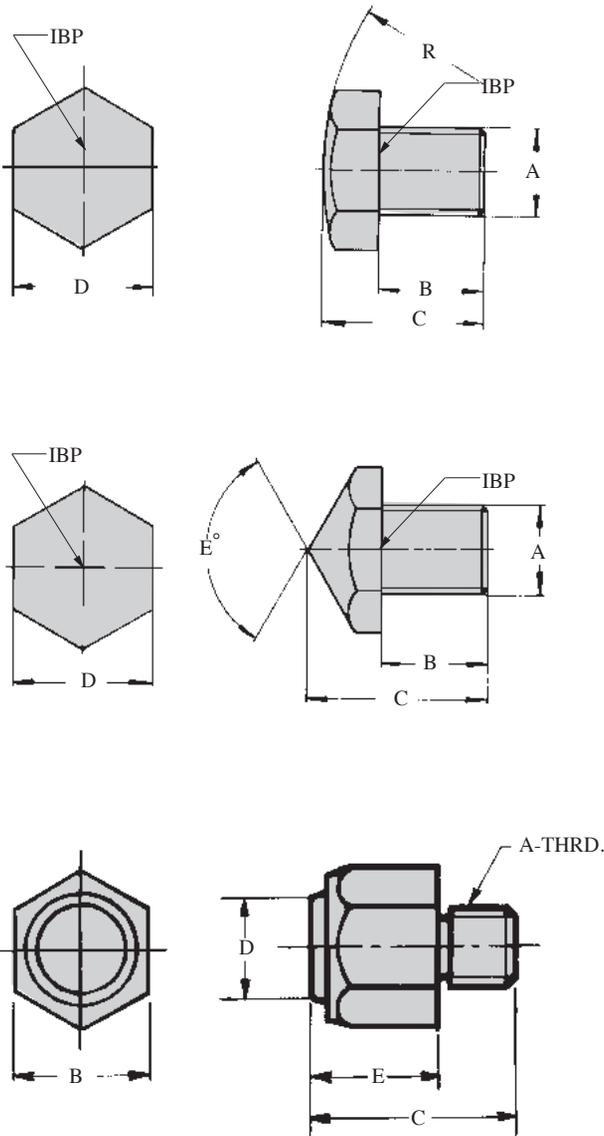
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Contact Bolts



- Radius contact bolt for most applications
- Pointed contact bolt for clamping in holes, and point clamping
- Swivel contact bolt distributes clamping force to prevent marring
- 1144 steel, hardened 50-60 RC



Radius

Part No.	A	B	C	D Hex	R Radius
CLR-401-CB	1/4-20	1/4	3/8	7/16	25/32
CLR-400-CB		3/8	25/32		
CLR-404-CB	5/16-18	5/16	1/2	1/2	1
CLR-402-CB		3/8	25/32		
CLR-403-CB	3/8-16	1/2	7/8	9/16	1-3/8
CLR-405-CB	1/2-13	1/2	7/8	3/4	1-3/4
CLR-406-CB	5/8-11	25/32	1-3/16	15/16	2-3/8
CLR-408-CB	3/4-10	1	1-3/8	1-1/8	2-3/8
CLR-409-CB	1-8	1-3/16	1-27/32	1-1/2	3-15/16
CLR-3614-027-CB	M5	.35	.75	8mm	.79
CLR-3614-039-CB*	M6	.24	.37	10mm	.79
CLR-3614-016-CB		.39	.79		
CLR-3614-038-CB*	M8	.31	.51	13mm	.98
CLR-3614-001-CB		.39	.79		
CLR-3614-002-CB	M10	.47	.87	17mm	1.38
CLR-3614-028-CB	M12	.47	.87	19mm	1.77
CLR-3614-015-CB	M20	.98	1.38	30mm	2.36
CLR-3614-018-CB	M30	1.38	2.13	46mm	3.94
CLR-3614-019-CB	M42	1.77	2.80	65mm	5.51
CLR-3614-020-CB	M48	2.36	3.54	75mm	9.84

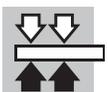
* These sizes are not heat treated.

Pointed

Part No.	A	B	C	D Hex	E°
CLR-413-CB	1/4-20	1/4	3/4	7/16	90
CLR-414-CB	3/8-16	1/2	1-1/16	9/16	90
CLR-415-CB	1/2-13	1/2	1	3/4	120
CLR-416-CB	5/8-11	25/32	1-3/8	15/16	120
CLR-417-CB	3/4-10	1	1-9/16	1-1/8	120
CLR-418-CB	1-8	1-3/16	1-31/32	1-1/2	120
CLR-3614-033-CB	M5	.35	.63	8mm	120°
CLR-3614-068-CB	M6	.24	.71	10mm	90°
CLR-3614-032-CB		.39	.87		
CLR-3614-069-CB	M8	.31	.87	13mm	90°
CLR-3614-021-CB	M10	.47	1.06	17mm	90°

Swivel

Part No.	A Dia	B Hex	C	D Dia	E
CLR-420-CB	5/16-18	9/16	.82	13/32	1/2
CLR-421-CB	3/8-16	13/16	1.29	19/32	13/16
CLR-422-CB	1/2-13	7/8	1.23	5/8	13/16
CLR-423-CB	5/8-11	1-1/16	1.61	13/16	1
CLR-3614-228-CB	M6	11mm	21mm	7.2mm	13mm
CLR-3614-072-CB	M8	11mm	21mm	7.2mm	13mm
CLR-3614-073-CB	M10	17mm	28mm	10.5mm	18mm
CLR-3614-074-CB	M12	17mm	30mm	10.5mm	18mm

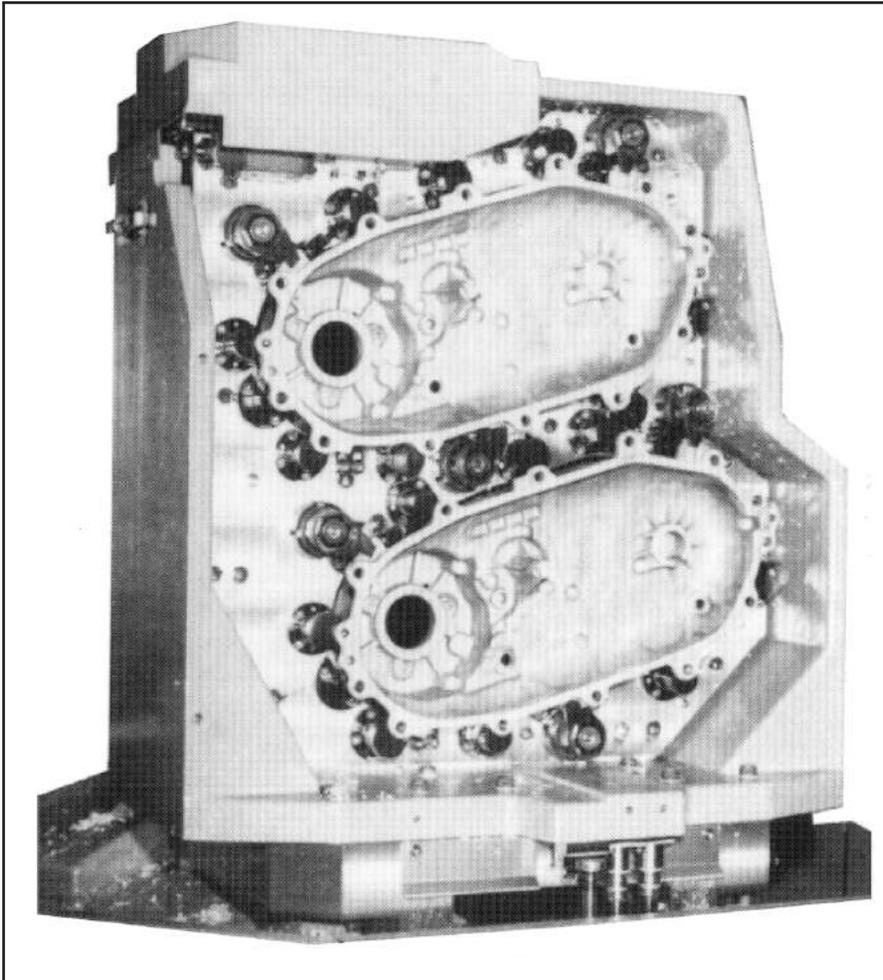


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Application Example



Two-sided Palletized Fixture for Machining Both Sides of an Aluminum Housing

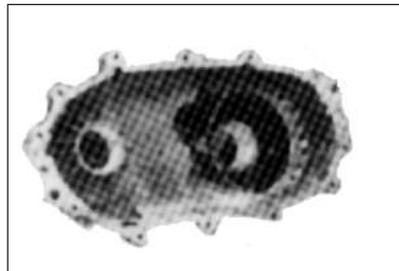
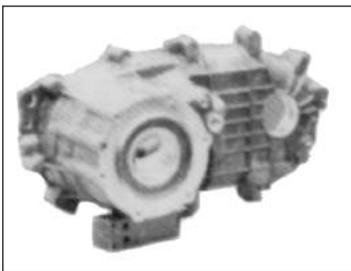


Cartridge/Manifold-Mounted Swing Clamps
(See Swing Clamps section)

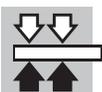
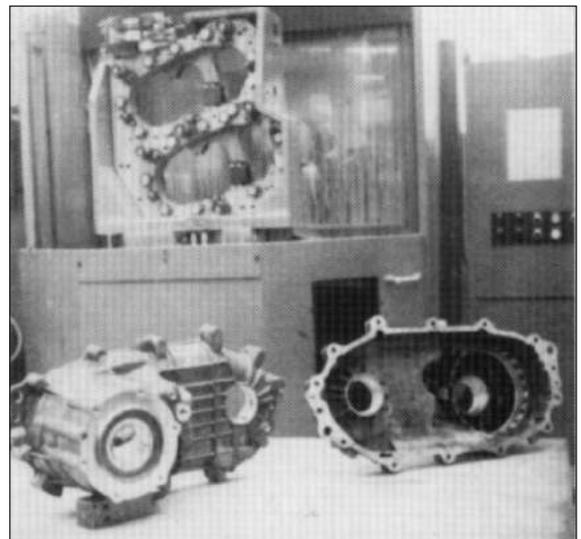


Fluid Advanced Work Supports
(See Work Supports section)

Palletized fixture holds two aluminum castings, allowing complete machining of both sides with only one setup. The fixture uses manifold-mounted Swing Clamps and Work Supports. Fluid is supplied through passages in the vertical fixture plate, so the fixture is free of tubing lines.



Both faces of the workpiece (above) are machined with one setup. Vertical fixture plate has cutouts (see photo at right) to allow access from both sides. Product designers integrated special clamping areas into the casting for easier fixturing.



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PRECISION MACHINE VISES INCREASE PRODUCTIVITY

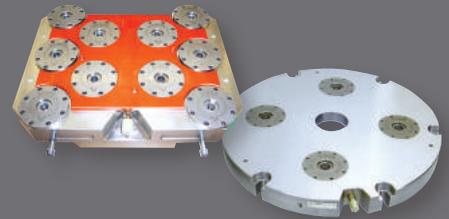
Use in Conjunction with the Zero Point Mounting System for Faster, More Accurate Fixture Set Ups



**For Machine Vises,
See Pages 94-111**

REDUCE SET-UP AND DOWNTIME!

Zero Point Mounting System for Quick Change Fixturing



This comprehensive system utilizes clamping components and insertion nipples, which provide an immediate zero point orientation.

- Reduce set up time by as much as 90% with zero point mounting
- Existing fixtures can be easily adapted
- Highly accurate positioning and repeatability
- Increased productivity
- Fast payback
- Set-up times slashed
- Fixture life extended



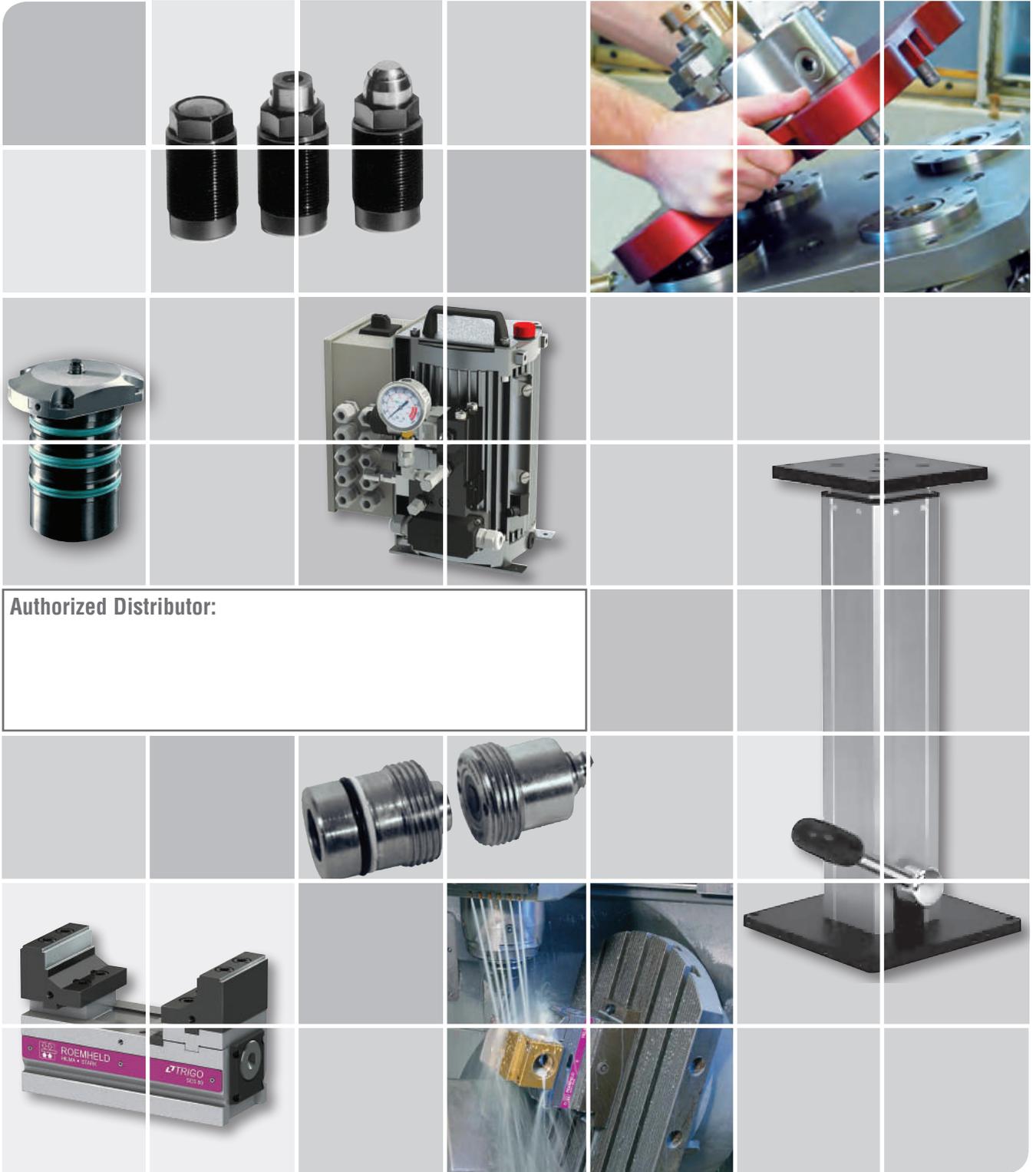
For Zero Point Mounting, See Pages 114-116



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