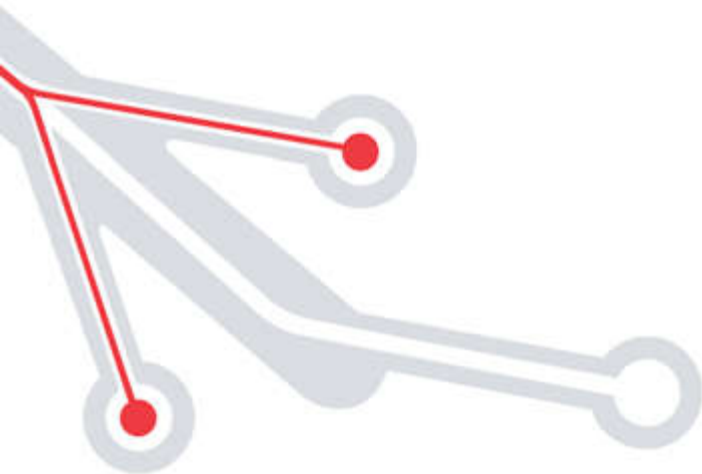
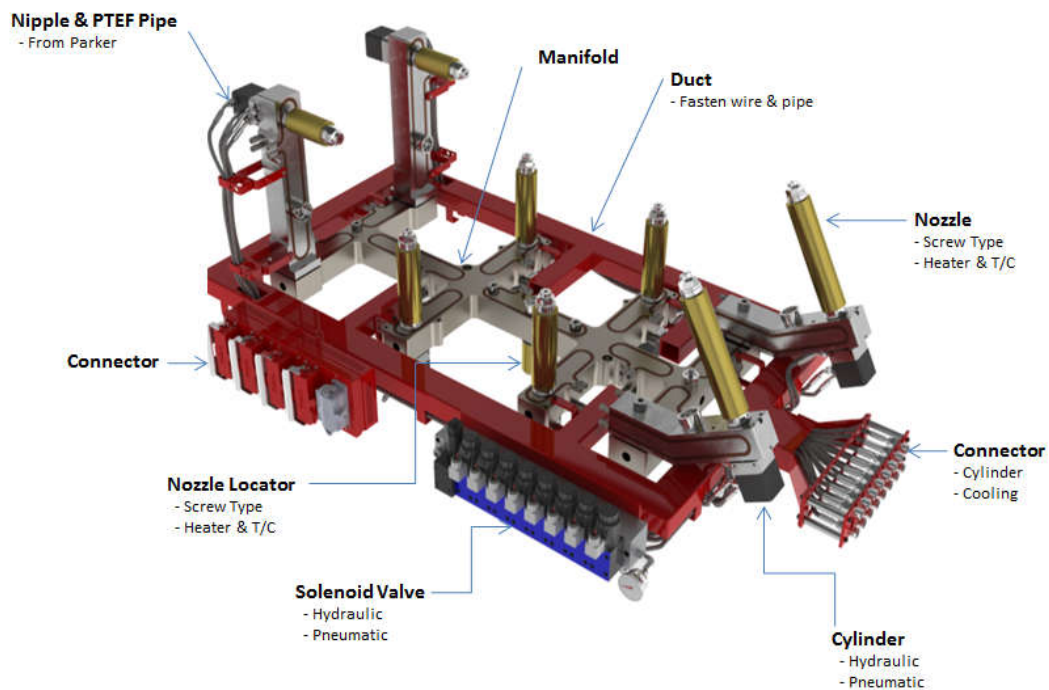


HOT RUNNER USER'S HANDBOOK



THANK YOU FOR CHOOSING A YUDO SYSTEM.

This system is manufactured using the most modern engineering technologies and manufacturing processes, but it is absolutely necessary the compliance with the best practices for operation and maintenance, in order to offer the maximum performance and reliability.

YUDO GLOBAL



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1. SAFETY

Injection systems are equipped with heating elements - electrical resistances - that function with electric current.



The use of electricity requires several care. Negligence to use proper safety procedures against electrical risks can cause fatal or irrecoverable damage.

YUDO is not responsible for damages caused by negligence or failure to comply with appropriate safety procedures.

If you have questions about any security procedure in systems installation and handling, please contact YUDO.

1.1. SAFETY PROCEDURES

During handling and Hot Runner System operation, high temperature and high pressure injection are used. In order to protect the operator in the workplace, it is important to ensure that all safety devices are installed in equipment as follows:

- Warning Labels placed in the mold and machine;
- Reference to the machine user manual for safety procedures and checks when they are not internally defined.
- Adequate individual protection equipment must be used to protect individual against high temperature surfaces, gases or liquids expelling, falls and cuts.
- To avoid serious burns wear protective clothing heat resistant, heat resistant gloves and face protection, including safety goggles. Use adequate ventilation for fumes.
- Contact with hot nozzle can cause severe burns. Use signs in a visible place stating "DANGER"
- Before performing any electrical work, check the Hot Runner System is properly connected to the earth. Failure to do so can result in a serious injury or death.
- All electrical power and thermocouple cables must be secured to prevent damage during assembly. The power and Thermo collective sockets should not have direct contact with the mold. It must be ensured an adequate connection of the Hot Runner System to earth.
- The operator shall ensure that, before system startup, it must be earthed or protected by equivalent security measures. In case of mains connection in different systems, or system components of normal operation specified, must be ensured proper grounding or other security measures equivalent to each component.

ATTENTION: Normally, the system is designed for a 2000 bar injection pressure

2. SYSTEM RECEPTION

Recommendations

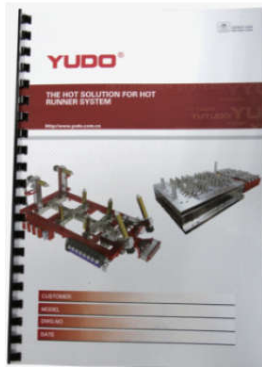
Make sure that the box is received in good condition.

Open box carefully, regard to its position so that parts do not fall with its opening.

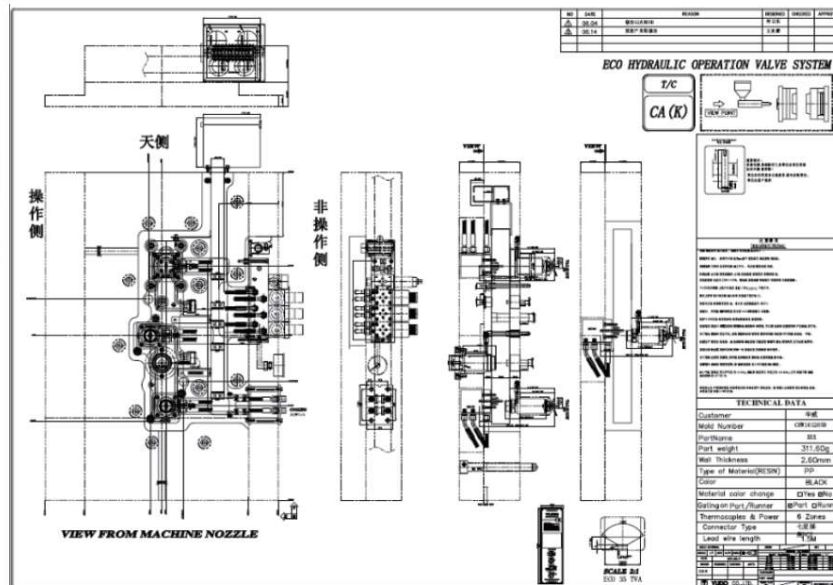
Make sure the box content corresponds to the document accompanying the load (packing list).

Visually inspect the system and its components. Check if it is damaged or defective, visually detectable.

If you detect any anomaly relating to previous sections, report immediately to YUDO



PARTS LIST		T/C
NO.	DESCRIPTION	QTY
1	ECO HYDRAULIC OPERATION VALVE SYSTEM	1
2	ECO HYDRAULIC OPERATION VALVE SYSTEM	1
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3. SYSTEM INSTALLATION AND DISASSEMBLY

Preliminary considerations

The procedures described below are essential for proper operation and use of the system.

All assembly and disassembly processes that are not detailed described, should be performed with appropriate tool and with enough and proper strength.

In case of any doubt contact YUDO.

YUDO does not assume responsibility for problems that may occur due to non-observance of these standards.

3.1. PREPARATION

Previously to system installation in the mold is required that the mold housing for the system is prepared. It is particularly important:

- 3.1.1.** Housings dimensions are in the correct measures, within the tolerances and finishing established by the project;
- 3.1.2.** It is clean, chipless and without moisture, oils or other;
- 3.1.3.** That all edges are disguised with rays or chamfers. Sharp edges are a real danger to the system,
- 3.1.4.** The area of the front seal should be ground to fit (not be eroded);
- 3.1.5.** If the material of the clamping plate has a strength of $< 1000\text{N/mm}^2$, the contact points on which the pressure pads of the manifold and the nozzle heads rest, have to be reinforced with sufficient strength;
- 3.1.6.** The radius of the sprue bush (RA) has to be adapted to the radius of the machine nozzle (RM). ($RA > RM + 1$);
- 3.1.7.** After measuring the heights of all Hot Runner components, calculate the height of the frame plate according to the determined air-gap measure.
- 3.1.8.** If sealing rings between nozzles and manifold are used they must be exchanged every time after having dismantled the Hot Runner system.

3.2. SYSTEM HANDLING FOR INSTALLATION

Injection systems have different handling ways depending on the type of construction.

YUDO offers 4 types of system construction:

A - Single Nozzle



Single Nozzle Open



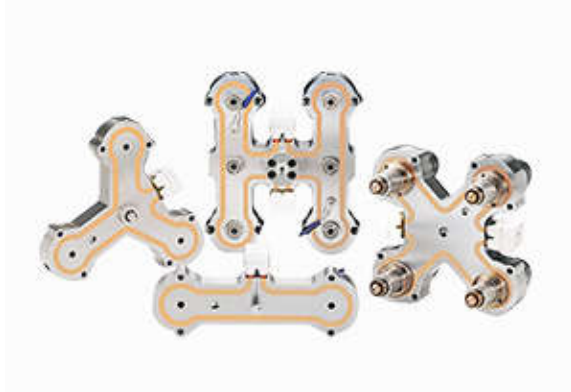
Single Nozzle Valve SAS



Single Nozzle Valve TSV

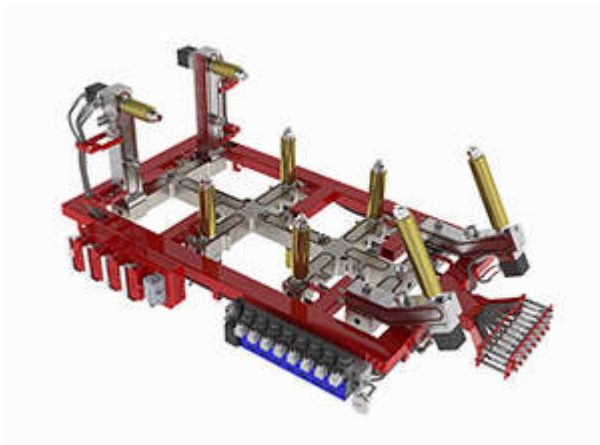
B - Basic HR System

The system is provided with the major components, manifold, nozzles, cylinders, etc., separately.
The specific composition of each system is in accordance with the project drawing approved by the client.



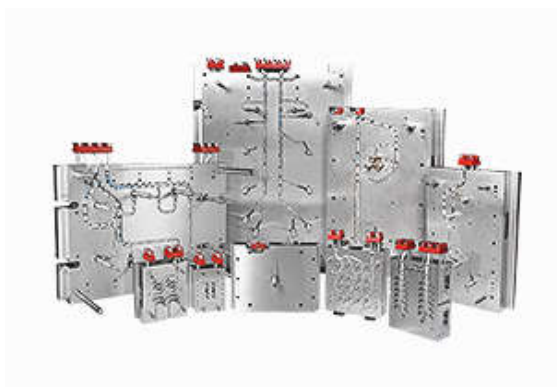
C - Pre Wired (PW) Eco Modu System

The system comes pre-assembled (prewired), with rails, plugs, connections and raccords.
The specific composition of each system is in accordance with the project drawing approved by the client.



D - Hot Half Modu System

This integrated system is provided in the dimensions of the mold plates. In these cases the injection system is provided already assembled inside the plates which form the mold structure in the same fixed part. It does not include cavity plates or any other mold structure.



In any case the system has sensitive components which require extra care:

- Electrical components - resistances, thermocouples, electrical coils
- Tips and torpedoes with high thermal conductivity, but low mechanical strength.
- Seals and gaskets susceptible to blows, cuts, or crushing.

Identify the type of construction applicable to your system. For each type of construction there are specific instructions,

Module A - Single Nozzle Type

Module B – Basic HR System Type

Module C1 – Pre Wired (PW) Eco Modu – Sliding Nozzles Type

Module C2 – Pre Wired (PW) Eco Modu – Threaded Nozzles Type

Module D – Hot Half Modu System Type

3.3. INSTALLATION AND DISASSEMBLY INSTRUCTIONS

MODULE A - SINGLE NOZZLE TYPE

GPS Open Nozzle
SAS Valve Nozzle
TSV Valve Nozzle

Installation

1. Make the dimensional housing verification with special care for the tight tolerance fitting zones and system seating dimensions according to the CAD file information. In case of doubt or unclear information contact YUDO.
 2. Make sure the housing is in proper condition to receive the hot runner and correct position to proceed with assembling without risks for people and equipment.
 3. Place the nozzle into its housing. If there are sliding bushes they must be placed in its position in the mold before the nozzle. Attention to the position pegs, when applicable.
 4. Move aside of dangerous areas all electrical cables to avoid crushing them.
 5. After positioning the electrical cables check if they are all in good condition.
 6. Identify properly and clearly all the wires for proper identification at any time.
 7. Follow the system electrical areas numbering according to the design, also visible on the ID Card.
 8. Assemble the centering ring. Tighten in a balanced way. The centering ring has to adjust the system as shown in the draft of the injection system. Be careful not to pinch the wires.
 9. Connect the wires taking into account:
 - Wires should have only sufficient and required length that allows easy opening of the electrical box cover and checking connections.
 - Wires should consider connecting terminals appropriate to your connection plug. The non-use or partial use of terminals can lead to system malfunction.
 - Wires cannot be added without YUDO technical opinion.
 - Plugs and their electrical box must be placed in order to be protected from stroke or other accidents that may damage the set.
 - The plugs must always be placed in appropriate boxes. The use of inappropriate boxes are the cause of many failures and system malfunctions and its injection.
 10. After finishing the assembly, check if there is no undue electrical current passage and if continuity is doing in the right poles.
 11. Normally thermocouples give electrical current passage to the mold, but not resistances.
 12. Check the heating system: Heat the system at 150 ° C, stabilize the temperature of all electrical heating zones and keep heating for 10 minutes.
 - Always use soft start (slow heating) up to the temperature of 100 ° C.
 13. Check the correct Valve Pins movement by activating the respective cylinders (Only for valve gate systems). For air or oil supply for piston operation, heat resistant pipes shall be mounted, resisting up to 180°C. Consider piping specifications according to maximum operating pressure either pneumatic or hydraulic. Consider safety factor to avoid rupture problems.
 14. Let the system cool down.
 15. Keep the system in a place free of moisture, metal chips or under possible physical shocks. Other care considered suitable will be important to keep the system in good working order.
- If any system anomaly is detected, it should be reported to YUDO.

Disassembly

1. Ensure that the system is at a temperature below 50 ° C.
2. Remove the clamping plate of the mold (plate 1), and the insulation plate when applicable.
3. Find the eyebolts placement points in the manifold (points of eyebolts that offer more resistance). Put in two of these points which are spaced apart (when applicable).
4. Lift the system until it back off 50 mm.
5. If the system is balanced continue until it is completely out of the mold.
6. If the system is unbalanced, change the position of eyebolts to balance. After the system has already back off of the housing 50 mm, already can use points of eyebolts off the manifold.
7. Place the system slowly on suitable surface. Take into account that the system has many hot spots that can be easily damaged. It is recommended that this is placed upon easels seating only the manifold.

Any anomaly detected in the system must be reported to YUDO.

MODULE B - BASIC HR SYSTEM TYPE

Basic HR System

Installation

1. Make the dimensional housing verification with special care for the tight tolerance fitting zones and system seating dimensions according to the CAD file information. In case of doubt or unclear information contact YUDO.
2. Make sure the housing is in proper conditions to receive the hot runner and in correct position to proceed with assembling without risks for people and equipment.
3. Place the nozzles into its housing. If there are sliding bushes they must be placed in position in the mold before the nozzle. Attention to the position pegs, when applicable.
4. Place the crush CU rings (when applicable). These rings are a security element, the system can function without them. Considering that the dimensional template and the system is correct, and there is no process of regulations out of considered in the project, these are not necessary.
5. Assemble the locating pins in the housing. The central positioning pin and anti-rotation pin. The central part spiking a ring spacer riding in and pin where the manifold will seat on.
6. Place the manifold in position. The correct position is set by the central pin position combined with the pin anti rotation.
 - The manifold has threaded holes for fixing eyebolts. These holes are some of the manifold fixing holes.
 - The manifold should slide easily to settle on the "head" of the nozzles. If it does not, do not use force. Remove and check the cause.
7. Move aside of dangerous areas all electrical cables to avoid crushing them.
8. After positioning the electrical cables check if they are all in good condition.
9. Tighten the screws on the manifold in a progressive and balanced manner. See tightening torque of the screws in **Appendix 1**
10. Check that the manifold is parallel to the bottom plan of the housing. If not, disassemble and determine the cause. It could be the manifold grip that is not balanced, or another reason to check.
11. Identify properly and clearly all the wires for proper identification at any time.
12. Follow the system electrical areas numbering according to the design, also visible on the ID Card.
13. Put the Pin guide ring in position (Only in valve gate systems).
14. Place the sliding plate reinforcement supports (when applicable).
15. Fit the sliding plate with particular attention to the electrical wires.
16. Tighten the plate in a balanced way.
 - Ensure good and complete cleaning of the drive circuit of the cylinders in the sliding plate. Often the appearance of metal chips or Teflon does not allow the smooth functioning of the system.
17. Check the independence and sealing of the circuits in accordance with the established in the project and in accordance with the intended operation of the valve gate system.
18. With a multimeter, verify that all resistance wires are not giving electrical current to the mold.
19. Assembly the cylinders, with particular care not to damage the seals (only in valve gate systems).
20. Enter the valve pins checking the correct position. The valve pins should come easily when the system has no plastic inside the channels. If it is difficult, check the cause (only in valve gate systems).
21. Close the cylinder cover by tightening the screws (only in valve gate systems).
22. Assembly the sequential operation manifold according to project drawing (only for sequential valve gate systems).
23. Assembly the centering ring. Tighten in a balanced way. The centering ring has to adjust the system as shown in the draft of the injection system.
24. Connect the wires taking into account:
 - Wires should have only sufficient and required length that allows easy opening of the electrical box cover and checking connections.
 - Wires should consider connecting terminals appropriate to your connection plug. The not use, or partial use of terminals can lead to system malfunction.

- Wires cannot be added without YUDO technical opinion.
 - Plugs and their electrical box must be placed in order to be protected from strokes or other accidents that may damage the set.
 - The plugs must always be placed in appropriate boxes. The use of inappropriate boxes is the cause of many electrical failures and system malfunctions.
- 25.** After finishing the assembly, check if there is no undue electrical current passage and if continuity is doing in the right poles.
 - 26.** Normally thermocouples give electrical current passage to the mold, but not resistances.
 - 27.** The ground wire must always be connected.
 - 28.** Check the heating system: Heat the system at 150 ° C, stabilize the temperature of all electrical areas and keep heating for 10 minutes.
 - Always use soft start (slow heating) up to the temperature of 100 ° C.
 - 29.** Check the correct Valve Pins movement by activating the respective cylinders (only for valve gate systems).
 - 30.** Let the system cool down.
 - 31.** Keep the system in a place free of moisture, metal chips or under possible physical shocks. Other care considered suitable will be important to keep the system in good working order.

YUDO provides hydraulic and pneumatic systems but each one only work correctly with the drive specified in the project. Do not test pneumatic systems with oil or vice versa.
Any anomaly detected in the system must be reported to YUDO.

Disassembly

1. Remove center ring
2. Remove cylinder cover (when applicable)
3. Remove valve pins (when applicable). In case the runner channels have plastic in, heat up the system up to melting temperature and then pull out the valve pins.
4. Let the system cool down and proceed after system temperature is below 50 ° C.
5. Remove the clamping plate of the mold (plate 1), and the insulation plate when applicable.
6. Find the eyebolts placement points in the manifold (points of eyebolts that offer more resistance). Put in two of these points which are spaced apart (when applicable)
7. Lift the system until it back off 50 mm.
8. If the system is balanced continue until it is completely out of the mold.
9. If the system is unbalanced, change the position of eyebolts to balance. After the system has already back off of the housing 50 mm, already can use points of eyebolts off the manifold.
10. Place the system slowly on suitable surface. Take into account that the system has many hot spots that can be easily damaged. It is recommended that this is placed upon easels seating only the manifold.

Any anomaly detected in the system must be reported to YUDO.

Assembly after operation

System Assembly after operation and with channels full of plastic is identical at all points except:

- Before introducing the valve pins, the system must be heated to the melting temperature of the plastic material that is inside the system. Warning: molten material will come out by the tips of the nozzles.
- If there is difficulty in introducing Valve pins, in order to stabilize the temperature is recommended to increase temperature 10 ° C more for 10 minutes.
- If, after this process, the valve pins do not enter with a 70 kgf force, do not force. In this case, there is some anomaly that must be identified and corrected.

[ACCESS HERE](#) VIDEO WITH INSTALLATION INSTRUCTIONS

MODULE C1 - PRE WIRED (PW) ECO MODU SYSTEM – SLIDING NOZZLES TYPE

Installation

1. Make the dimensional housing verification with special care for the tight tolerance fitting zones and system seating dimensions according to the CAD file information. In case of doubt or unclear information contact YUDO.
2. Make sure the housing is in proper conditions to receive the hot runner and in correct position to proceed with assembling without risks for people and equipment.
3. Assemble pin anti rotation in the mold. The central spiking should be attached to the Manifold.
4. Identify in the system the different placement points of the eyebolts and search for the combination that allows raising the balanced system, keeping the manifold horizontally or close to. On systems that do not allow the placement of eyebolts, it is recommended to use straps or magnetic.
5. Place lubricant grease on the tips of the nozzles and adjust zones in diameter, particularly H7 and H6 fit.
6. Place lubricant grease on nozzle bushes (nozzle attachment bushings)
7. Install the manifold in place. The correct position is set by the central pin position combined with the pin anti rotation.
8. Lower the system into the housing with the nozzles pointed to respective housings. If there are sliding bushes they must be placed in position in the mold before the nozzles.
9. These systems are assembled in a cold temperature.
10. Lower the system to the housing and check that the manifold is in its correct position. The correct position is defined by the central pin position combined with the anti-rotation pin.
The system is expected to fall easily until settle the supports. If not, do not use force. Relieve the nozzle screws in a turn (360°). Then again bring down the system to its position in the mold. If there is any difficulty may be used a Teflon mallet, beating with moderate force in the manifold supports.

11. After the system is properly housed, re-tighten the screws nozzle with correct torque force - see

Appendix 1

Do it in a progressive and balanced manner.

(This is only necessary in the first assembly or after disassembly of the manifold nozzles)

12. Check that the manifold is parallel to the bottom plan of the housing. Otherwise, disassemble and determine the cause. It could be the manifold grip that is not balanced, or another reason to check.
13. Put in place the cylinder rings. Only for valve gate systems and when they are part of the system design.
14. Assemble the sliding plate with particular attention to interference with any system component.
15. Tighten the plate in a balanced way.
16. Assemble the centering ring. Tighten in a balanced way. The centering ring has to adjust the system as shown in the injection system draft.
17. Plugs and their electrical connections must be kept away from contact with water oil or other liquids.
18. Plugs and their electrical box must be placed in order to be protected from stroke or other accidents that may damage the set.
19. After finishing the assembly, check if there is no undue electrical current passage and if continuity is doing in the right poles. Normally thermocouples are not isolated.
20. Check the heating of the system: Heat the system up to 150 ° C, stabilize the temperature of all electrical heating zones and keep heating for 10 minutes. Always use soft start (slow heating) up to the temperature of 100 ° C.
21. Check the correct Valve Pins movement by activating the respective cylinders (Only for valve gate systems).
22. Let the system cool down.
23. Keep the system in a place free of moisture, metal chips or under possible physical shocks. Other care considered suitable will be important to keep the system in good working order.
YUDO provides hydraulic and pneumatic systems but each one only work correctly with the drive specified in the project. Do not test pneumatic systems with oil or vice versa.

Any anomaly detected in the system must be reported to YUDO.

Disassembly

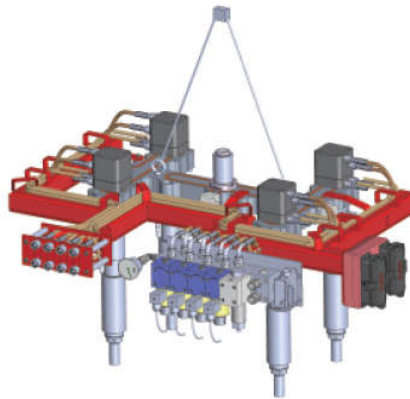
1. Ensure that the system is at a temperature below 50 ° C.
2. Remove the clamping plate of the mold (plate 1), and the insulation plate when applicable.
3. Find the eyebolts placement points in the manifold (points of eyebolts that offer more resistance). Put in two of these points which are spaced apart (when applicable).
4. Lift the system until it back off 50 mm.
5. If the system is balanced continue until it is completely out of the mold.
6. If the system is unbalanced, change the position of eyebolts to balance. After the system has already back off of the housing 50 mm, already can use points of eyebolts off the manifold.
7. Place the system slowly on suitable surface. Take into account that the system has many hot spots that can be easily damaged. It is recommended that this is placed upon easels seating only the manifold.

Any anomaly detected in the system must be reported to YUDO.

MODULE C2 - PRE WIRED (PW) ECO MODU SYSTEM – THREADED NOZZLES TYPE

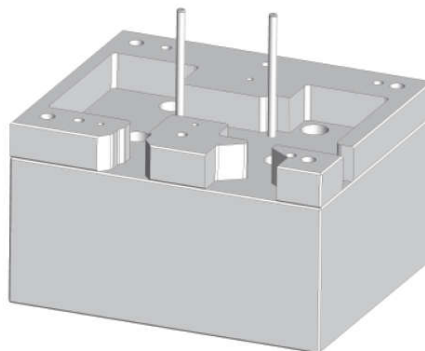
Installation

1. Make the dimensional housing verification with special care for the tight tolerance fitting zones and system seating dimensions according to the CAD file information. In case of doubt or unclear information contact YUDO.
2. Make sure the housing is in proper conditions to receive the hot runner and I correct position to proceed with assembling without risks for people and equipment.
3. Assemble pin anti rotation in the mold. The central spiking should be attached to the Manifold.
4. Identify in the system the different placement points of the eyebolts and search for the combination that allows raising the balanced system, keeping the manifold horizontally or close to. On systems that do not allow the placement of eyebolts, it is recommended to use straps or magnetic.
5. Apply lubricant grease in the tips of the nozzles and adjust zones in diameter, particularly H7 and H6 fit.
6. Install the manifold in place. The correct position is set by the central pin position combined with the pin anti rotation.
7. Lower the system into housing with the nozzles pointed to respective housings. If there are sliding bushes they must be placed in position in the mold before the nozzles. Attention to the position pegs, when applicable.

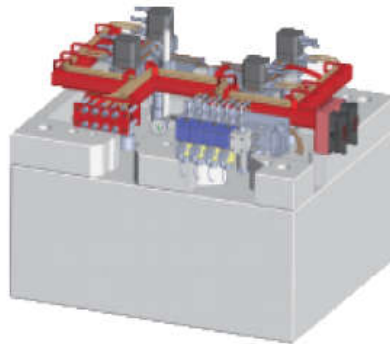


These systems are normally assembled cold. In special cases they must be assembled hot or "middle temperature". Check assembling condition in the system drawing. The absence of a specific indication, means standard assembly, i.e., cold.

8. Lower the system to the housing and check that the manifold is in its correct position. The correct position is defined by the central pin position combined with the anti-rotation pin.
9. The system is expected to fall easily until settle the supports. If not, do not use force. Check system interference with the lubrication of the mold and the adjustment zones. Then again bring down the system to its position in the mold If there is any difficulty may be used a Teflon mallet, beating with moderate force in the manifold supports.



10. Check that the manifold is parallel to the bottom plan of the housing. If not, disassemble and determine the cause.



- 11.** Assemble the sliding plate with particular attention to interference with any system component.
- 12.** Tighten the plate in a balanced way.
- 13.** Assemble the centering ring. Tighten in a balanced way. The centering ring has to adjust the system as shown in the injection system draft.
- 14.** Plugs and their electrical connections must be kept away from contact with water oil or other liquids.
- 15.** Plugs and their electrical box must be placed in order to be protected from stroke or other accidents that may damage the set.
- 19.** After finishing the assembly, check if there is no undue electrical current passage and if continuity is doing in the right poles. Normally thermocouples transmit electrical current to the mold.
- 20.** Check the heating system: Heat the system at 150 ° C, stabilize the temperature of all electrical areas and keep heating for 10 minutes.
- Always use soft start (slow heating) to the temperature of 100 ° C.
- 21.** Check the correct Valve Pins movement by activating the respective cylinders (Only for valve gate systems).
- 22.** Let the system cool down.
- 23.** Keep the system in a place free of moisture, metal chips or under possible physical shocks. Other care considered suitable will be important to keep the system in good working order.

YUDO provides hydraulic and pneumatic systems but each one only work correctly with the drive specified in the project. Do not test pneumatic systems with oil or vice versa.

Any anomaly detected in the system must be reported to YUDO.

Disassembly

- 1.** Ensure that the system is at a temperature below 50 ° C. The standard is cold, below 50 ° C, but there are special cases of disassembly hot or half temperature.
- 2.** Remove the sliding plate of the mold (plate 1), and the insulation plate when applicable.
- 3.** Find the eyebolts placement points in the manifold (points of eyebolts that offer more resistance). Put in two of these points which are spaced apart.
- 4.** Lift the system until it back off 50 mm.
- 5.** If the system is balanced continue until it is completely out of the mold.
- 6.** If the system is unbalanced, change the position of eyebolts to balance. After the system has already back off of the housing 50 mm, already can use points of eyebolts off the manifold.
- 7.** Place the system slowly on suitable surface. Take into account that the system has many hot spots that can be easily damaged. It is recommended that this is placed upon easels seating only the manifold.

Any anomaly detected in the system must be reported to YUDO.

[Access Here](#) VIDEO WITH INSTALLATION INSTRUCTIONS

MODULE D - HOT HALF MODU SYSTEM TYPE

Installation

1. Apply lubricant grease in assembling guides and adjust zones, particularly H7 and H6 fit to facilitate housing and prevent damage.
2. The Hot Half is to be assembled for vertical movement in the direction from top to bottom. The system should be lowered to the housing in the mold. We advise against any movement of the mold on the system or assembling horizontally.
3. Raise up the system by own attachment points and in a balanced way.
4. Check that all accommodation is ready to receive the system.
5. Lower down the system by aligning the assembling guides with their housings.
6. Check that the nozzles also coincide with the respective positions in the mold.
7. Lower the system carefully to the complete closure of the Hot Half structure in the mold structure.
8. Check that the settlement is done correctly and uniformly throughout the area provided support.
9. Tighten the screws evenly.
10. Plugs and their electrical connections must be kept away from contact with water oil or other liquids.
11. Plugs and their electrical box must be placed in order to be protected from stroke or other accidents that may damage the set.
12. After finishing the assembly, check if there is no undue electrical current passage and if continuity is doing in the right poles.
13. Normally thermocouples transmit electrical current to the mold.
14. Check the heating system: Heat the system at 150 ° C, stabilize the temperature of all electrical areas and keep heating for 10 minutes.
- Always use soft start (slow heating) to the temperature of 100 ° C.
15. Check the correct Valve Pins movement by activating the respective cylinders (Only for valve gate systems).
16. Let the system cool down.
17. Keep the system in a place free of moisture, metal chips or under possible physical shocks. Other care considered suitable will be important to keep the system in good working order.

Any anomaly detected in the system must be reported to YUDO.

Disassembly

1. Install the mold on solid and stable basis keeping the clamping plate upwards.
2. Unscrew the cavity / hot half fixing bolts.
3. Make sure that they are not any other fixing elements attached to both parts of the mold (hot half / cavity)
4. Set eye bolts in position that allow correct fixing and balanced lifting of the hot half.
5. Lift up the hot half carefully until all hot half components are completely apart from cavity / Plate
6. Place the system slowly on suitable surface. Take into account that the system has many hot spots that can be easily damaged. It is recommended that this is placed upon easels seating only the manifold.

Any anomaly detected in the system must be reported to YUDO.

4. SYSTEM STARTUP AND SHUTDOWN

4.1. STARTUP

4.1.1. Preparation for molding – Hot Runner system in general

- The injection unit stays attached to the mold during cycle.
- Connect power and thermo collective cable.
- Check, if power and thermo wiring do correspond by separately heating up each zone (for a short period of time).
- A proper grounding at the injection molding machine must be ensured.
- The mold temperature recommended by the material manufacturer has to be observed.
- Please fix the YUDO type plate with the order number on the outside of the mold so that the Hot Runner can easily be identified.

4.1.2. Start-up and filling of an "unfilled" Hot Runner system

- Mold and barrel should have reached the recommended temperatures.
- Switch on the manifold of the Hot Runner system and let the humidity from the heaters dry out at a temperature between 100°C and 120°C for approx. 10 minutes. When the manifold reach his setting temperature, switch on nozzles.
- Set processing temperature and heat system in even heat-up mode for 3 - 5 minutes, so that the preload is ensured.
- Make sure that there is a sufficient barrel pressure. Without that leakage might occur between machine nozzle and mold. Fill the Hot Runner with approx. 300 - 400 bar back pressure until plastic emerges at the gates.
- When filling the Hot Runner system use **natural non colored material and without additives**, especially if color changes are planned or if materials with flame retardant additives and glass fibers respectively are used.
- Start molding process.
- If intense cooling of the mold is required, increase temperature by approx. 20°C - 25°C if necessary.

NOTE: Normally, the system is designed for a 2000 bar injection pressure

WARNING: You must follow the guidelines of the material manufacturer!

4.2. SHUTDOWN

4.2.1. Preparation for the end of production – Hot Runner in general

- With valve gate system and particularly with pneumatic drivers, we recommend to open gate before switch off heaters.
- At the end of production, use **natural material without additives**, especially if color changes are planned or if materials with flame retardant additives and glass fibers respectively are used.
- If flame retardant materials or materials with glass fibers are used, we recommends to purge the Hot Runner system with natural material of the same type without additives or purging material after finishing production. Thus the re-start of the system will become easier.

5. PROCESS ADVISER

The process of injecting plastic parts involves several areas of the technical knowledge bringing us to an immense and complex puzzle of technical definitions and parameters that can be put together in a huge number of different configurations.

Not aiming to approach this complex subject, in this handbook we just offer some basic generic guidelines for typical issues that involve directly the parameters set up of the hot runner.

5.1. COLOR CHANGE

The process of changing color in injected plastic parts is complex and depend of many factors with big variation.

The optimal performance is then a combination of factors that can only be achieved on the basis of a case by case study, that has to include a battery of validation tests.

Nevertheless there are some generic recommendations that we advise to our customers:

- Whenever possible use front removable inserts. Thus the tips become accessible for cleaning.
- Adjust the machine sprue diameter to the hot runner inlet diameter.
- The first shot should be non-coloured material.
- For the color change decrease barrel temperature by 20 - 40°C and change to natural material.
- Purge the barrel with natural material first, the Hot Runner system afterwards.
- When approx. 95% of the purged material contains of natural material, increase the temperature of the Hot Runner by 30 - 50°C and continue to purge with natural material until no further improvement can be achieved. You can also increase the injection speed from 10 to 20%.
- Set temperature back to standard settings.
- Start molding with new color.

ATTENTION: Please observe the guidelines of the material manufacturer!

5.2. GLASS FIBER

- Do not stop production with the runners filled with glass fibre filled resin. Use non filled or purging material. If, for some reason, it is not possible, at least stop production with valve pin stopped in open position.

5.3. MATERIAL DEGRADATION

- Respect plastic material specifications.
- Check the technical data sheet of the plastic material previously to process initiation.
- Residence time of the material specifications shall be taken into consideration when mold stop.
- Overtime at too high temperature may cause serious problems.
- Use standby temperatures according to material specifications.

6. PREVENTIVE MAINTENANCE

Preventive Maintenance is very important to keep the hot runner in good operation conditions.

PREVENTIVE VERIFICATION PLAN						
Sistem Type	S/N Open	S/N Valve	HR System Open	Basic HR System Valve	Pre Wired (PW) Eco Modu	Hot half Modu system
Components						
Cylinders Seals	X	1 year or 1M Shots	X	1 year or 1M shots	1 year or 1M shots	1 year or 1M shots
Tips	2 years or 2M shots (6 months or 0.5M shots if abrasive material)					
Valve Pin + PGB	X	3 years or 3M shots	X	3 years or 3M shots	3 years or 3M shots	3 years or 3M shots
Hoses	X	3 years or 3M shots	X	X	3 years or 3M shots	x
Circuit cleaning Air, oil, water in plates	X	X	X	1 year or 1M shots	1 year or 1M shots	1 year or 1M shots
Heaters + TC	5 years or 5M shots					
General Retrofitting (overhauling)	10 years or 10M shots					

Regardless of the hot runner working time, preventive maintenance shall be conducted based on the shot number.

[ACCESS HERE](#) MAINTENANCE INSTRUCTIONS

APPENDIX 1 TORQUE TABLE

Reference	Torque (Nm)
NL BODY 25	200
NL BODY 35	300
NL BODY 45	400
NLTIP 25	100
NL TIP 35	150
NL TIP 45	250
PGB 14	60
PGB 20	150
PGB (OLD)	150
TINA AM 08 NOZZLE BODY	200
TINA AM 10 NOZZLE BODY	200
TINA AM 12 NOZZLE BODY	250
TINA AM 15/18 NOZZLE BODY	300
TINA AM 22 NOZZLE BODY	400
TINA GPS08 NOZZLE BODY	200
TINA GPS10 NOZZLE BODY	200
TINA GPS15 NOZZLE BODY	300
TINA GPS22 NOZZLE BODY	400
TINA GPSA08 NOZZLE BODY	80
TINA GPSA10 NOZZLE BODY	140
TINA GPSA15 NOZZLE BODY	240
TINA GPSA22 NOZZLE BODY	340
TINA EP 05 NOZZLE BODY	120
TINA EP 06 NOZZLE BODY	120
TINA EP 08 NOZZLE BODY	185
TINA EP 10 NOZZLE BODY	185
TINA EP SPECIAL	200
TINA MCT 05 NOZZLE BODY	120
TINA MCT 06 NOZZLE BODY	120
TINA MCT 08 NOZZLE BODY	185
TINA MCT 10 NOZZLE BODY	185
TINA MCT SPECIAL	200

Reference	Torque (Nm)
End Plug Ø 6	35
End Plug Ø 7,7	60
End Plug Ø 9,7	90
End Plug Ø 11,7	140
End Plug Ø 14,7	140
End Plug Ø 17,7	190
End Plug Ø 19,7	200
End Plug Ø 22	200

Reference TINA AM / GP / GPS / GPSA / EP / MCT	Torque (Nm)
TINA GP 08 UNION/BUSH	40
TINA GP 08 TAC BUSH	
TINA GP 08 TLC BUSH	
TINA GP 08 TOE BUSH	
TINA GP 10 UNION/BUSH	100
TINA GP 10 TAC BUSH	
TINA GP 10 TLC BUSH	
TINA GP 10 TOE BUSH	
TINA GP 10 SOE BUSH	
TINA GP 10 TVA BUSH	
TINA GP 10 TVL BUSH	
TINA AM 12 UNION/BUSH	100
TINA AM 12 TLC BUSH	
TINA AM 12 TOE BUSH	
TINA AM 12 SOE BUSH	
TINA AM 12 TAC BUSH	
TINA AM 12 TVA BUSH	
TINA AM 12 TVL BUSH	

For other TINA AM confer TINA GP Table	
TINA GP 15 UNION/BUSH	200
TINA GP 15 TAC BUSH	
TINA GP 15 TLC BUSH	
TINA GP 15 TOE BUSH	
TINA GP 15 SOE BUSH	
TINA GP 15 TVA BUSH	
TINA GP 15 TVL BUSH	
TINA GP 22 UNION/BUSH	300
TINA GP 22 TAC BUSH	
TINA GP 22 TLC BUSH	
TINA GP 22 TOE BUSH	
TINA GP 22 SOE BUSH	
TINA GP 22 TVA BUSH	
TINA GP 22 TVL BUSH	

For TINA MC, confer TINA EP Table.	
TINA EP 05 UNION/BUSH	30
TINA EP 05 TAC BUSH	
TINA EP 05 TLC BUSH	
TINA EP 05 TOE BUSH	
TINA EP 06 UNION/BUSH	30
TINA EP 06 TAC BUSH	
TINA EP 06 TLC BUSH	
TINA EP 06 TOE BUSH	
TINA EP 08 UNION/BUSH	40
TINA EP 08 TAC BUSH	
TINA EP 08 TLC BUSH	
TINA EP 08 TOE BUSH	
TINA EP 10 UNION/BUSH	100
TINA EP 10 TAC BUSH	
TINA EP 10 TLC BUSH	
TINA EP 10 TOE BUSH	

Reference	Torque (Nm)
YURI 22 VV TIP	40
YURI 22 VC TIP	
YURI 32 VV TIP	50
YURI 32 VC TIP	
YURI 42 VV TIP	60
YURI 42 VC TIP	
SAS 22 VV TIP	40
SAS 22 VC TIP	
SAS 32 VV TIP	50
SAS 32 VC TIP	
SAS 42 VV TIP	60
SAS 42 VC TIP	
BALA 18 CC TIP	40
BALA 18 VV TIP	
BALA 18 VC TIP	
BALA 18 OA TIP	
BALA 18 TOE BUSH	40
BALA 18 TLC BUSH	
BALA 18 TAC BUSH	
BALA 18 SOE BUSH	
BALA 18 TVL BUSH	
BALA 25 CC TIP	80
BALA 25 VV TIP	
BALA 25 VC TIP	
BALA 25 OA TIP	80
BALA 25 TOE BUSH	
BALA 25 TLC BUSH	
BALA 25 TAC BUSH	
BALA 25 SOE BUSH	
BALA 25 TVA BUSH	
BALA 25 TVL BUSH	
BALA 35 CC TIP	180
BALA 35 VV TIP	
BALA 35 VC TIP	
BALA 35 OA TIP	
BALA 35 TOE BUSH	180
BALA 35 TLC BUSH	
BALA 35 TAC BUSH	
BALA 35 SOE BUSH	
BALA 35 TVA BUSH	
BALA 35 TVL BUSH	
BALA 45 CC TIP	50
BALA 45 VV TIP	
BALA 45 VC TIP	
BALA 45 OA TIP	
BALA 45 TOE BUSH	260
BALA 45 TLC BUSH	
BALA 45 TAC BUSH	
BALA 45 SOE BUSH	
BALA 45 TVA BUSH	207
BALA 45 TVL BUSH	
Reference	Torque (Nm)
YUEN 18 UNION	40