

Safe Operating Instructions



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1.0 Safety Precautions

1.1 Personal Protection

While operating this equipment it is recommended that the following personal protective equipment be worn;

- Long sleeve shirt and trousers or overalls
- High visibility vest or high visibility component included in clothing
- Gloves
- Safety glasses
- Steel capped protective footwear

To avoid personal injury keep hands and feet away from moving components during operation.

Always keep your body to the side of the swaging operation, and ensure guards are in place during operation.

Be sure there is adequate ventilation when the generator is in use.

Running the generator will cause the engine and exhaust to become hot. Keep body parts clear until components have cooled.

Read all instructions, warnings and cautions carefully. Follow all safety precautions to avoid personal injury or property damage during system operation.

Ingal cannot be responsible for damage or injury resulting from unsafe product use or incorrect product and/or system operation. Contact Ingal when in doubt regarding safety precautions and operations.

1.2 Equipment Operation

The Ingal swaging unit is designed only for the purposes described in this document. All other use is prohibited.

Do not subject the hydraulic hoses to any potential hazard such as fire, extreme heat or cold, sharp surfaces or heavy impact.

Do not allow the hoses to kink, twist, curl or bend so tightly that the fluid flow within the hose is blocked or reduced.

1.3 Site Safety

Identify the area where work is to be completed and clear area of debris so there are no trip hazards or other obstructions which may prevent the work being conducted in a safe manner and ensure suitable traffic control is in place.



2.0 Component Identification





Figure 1: Hydraulic Pump Unit



Figure 2: Swaging Unit

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Figure 3: Generator

Table 1: List of Components				
Component ID	Description	Component ID	Description	
1	ReliefValve	15	Locking Nut	
2	Electric Box	16	Pulling Rod Guide	
3	Heat Exchanger	17	Allen Screw	
4	Roll Bar	18	Synchronizing Pins	
5	Return Line Filter	19	Cog Wheel	
6	Bottom Plate	20	Cog Wheel Guard	
7	Quick Coupling	21	Muffler	
8	Hydraulic Ram	22	Air Cleaner	
9	Threaded Arm	23	Recoil Starter	
10	Cylinder Bracket	24	Spark Plug	
11	Pulling Rods	25	Starter Grip	
12	Compression Tube	26	Choke lever	
13	Pulling Rods	27	Fuel Valve Lever	
14	Cross Bar	28	Engine Switch	



3.0 Inspections

3.1 Hose Inspections

Before operating the swaging unit, check that all hose connections are tight with the proper tools. If loose, tighten using proper tools. Do not over tighten. Connections need only be tightened securely and leak free. Over tightening may cause premature thread failure or high-pressure fittings to split at pressures lower than their rated capacities.

The hydraulic hoses are fitted with protective sheathing to prevent escaping hydraulic fluid from causing injury. Do not operate the swaging tool if the sheathing is damaged or missing.

3.2 Hydraulic Fluid Level

Check the fluid level in the hydraulic reservoir through the viewing window. The power supply is to be disconnected when adding fluid to the reservoir. Only use approved Energia hydraulic fluid to fill the reservoir.

- 1. Clean the area around the filler cap before removing the filler cap.
- 2. Use a clean funnel with a filter when adding fluid.
- 3. The oil level will typically be around 25mm from the top of the pump cover

3.3 Bleeding Air from the System

Air can accumulate in the hydraulic system during the initial set-up or after prolonged use, causing the cylinder to respond slowly or in an unstable manner. To remove the air;

- 1. Loosen a fitting that is situated higher than the rest of the fittings in the system.
- 2. Run the pump until a steady flow of oil free of suspended air bubbles is observed.
- 3. Tighten the fitting.

3.4 Generator Fuel Level

The Honda engine is designed to run on unleaded fuel. Use an unleaded fuel with a pump octane rating of 86 or higher. Unleaded fuel containing no more that 10% ethanol (E10) may be used. Check the fuel level before starting the generator.

If refuelling is required, refuel when the engine is off and in a well-ventilated area. Do not over fill and wipe away any spilled fuel. Avoid getting water or dirt in the fuel tank. Ensure fuel is stored in an approved container.

3.5 Generator Oil Level

Oil is a major factor affecting performance and service life. Check the engine oil level with the engine stopped and in a level position. Use 4-stroke automotive detergent oil.

- 1. Remove the oil filler cap/dipstick and wipe it clean.
- 2. Insert the oil filler cap/dipstick into the oil filler neck, but do not screw it in, then remove it to check the oil level.
- 3. If the oil level is near or below the lower limit mark on the dipstick, fill to the upper limit mark. Do not overfill.
- 4. Reinstall the oil filler cap/dipstick.



4.0 Generator Operation

A generator is used as the power source to the hydraulic pump. For proper operation of the generator, ensure that the area is well ventilated and kept dry.

To operate the generator;

1. Turn the fuel valve ON.



2. To start a cold engine, move the choke lever to the CLOSED position. To restart a warm engine leave the choke lever in the OPEN position.



3. Move the throttle lever away from the MIN position, about 1/3 of the way toward the MAX position.



4. Turn the engine switch ON.



- 5. Pull the starter grip lightly until you feel resistance, then pull briskly. Return the starter grip gently.
- 6. If the choke lever has been moved to the CLOSED position to start the engine, gradually move it to the OPEN position as the engine warms up.
- 7. Position the throttle lever for the desired engine speed.

To stop the generator in an emergency, simply turn the engine switch to the OFF position. Under normal conditions use the following procedure;

- 1. Move the throttle lever to the MIN position
- 2. Turn the engine switch to the OFF position.
- 3. Turn the fuel lever valve to the OFF position.

When transporting the generator, ensure the fuel lever valve is switched OFF. If left ON, fuel may gather in the engine crankcase and dilute the engine oil. This will reduce the lubrication properties of the oil can cause severe engine damage.



5.0 Swaging Unit Operation

5.1 Attachment of the End Fitting

Only end fittings supplied by Ingal Civil Products are to be used.

- 1. Identify the location where the end fitting is to be attached to the cable.
- 2. Cut the cable at the required location. This can be achieved by using a wire cutter or a disk grinder. If using a disk grinder the following is to be observed;
 - i. The operator is to be fitted with a full face shield and PPE as noted in Section 1.1
 - ii. The wire rope is to be appropriately clamped or secured. The cable should NOT be held by hand when cutting.
 - iii. Care is to be taken not to contact the cable downstream of the cutting location.
- 3. When the cable is cut to its correct length, remove any burrs with a file and ensure the rope is correctly twisted.
- 4. Insert the cable into the end fitting. The end fitting is manufactured with an observation hole to ensure the cable is embedded to its full depth.

Note: At the anchor locations, it is necessary to attach a safety check rope to the cable. Slide the thimble eye of the check rope over the cable prior to the attachment of the end fitting.

5.2 Swaging the End Fitting

- 1. Turn the generator on in accordance with Section 4.0
- 2. Turn the main isolator switch located on the control box to the ON position. Refer to Figure 7.
- 3. Push the reset button on the control box. Refer to Figure 7.
- 4. Lift the guard away from the entrance to the swaging roller dies.
- 5. Remove the nut from the end fitting.
- 6. Feed the end fitting through the roller die area so that the threaded section of the end fitting passes through the cross bar.
- 7. Reattach the end fitting nut so that the thread of the end fitting is flush with the back of the nut. Refer to Figure 6.
- 8. Gripping the end fitting, pull back to ensure a tight connection with the cross bar.
- 9. Using an allen key, rotate the roller dies so that they rest against the end fitting. Refer to Figure 8.
- 10. Remove the allen key and return the guard to its position in front of the roller dies. Refer to Figure 9.
- 11. Operate the hydraulic ram by pressing the button on the pendant control.
- 12. Pressure around the end fitting will increase as the hydraulic ram moves and the roller dies rotate. The end fitting will pull through the roller dies.
- 13. Once the swage is complete, rotate the roller dies using the allen key to the front of the swaging unit.
- 14. Remove the end fitting from the cross bar by releasing the nut.
- 15. Return the nut to the end fitting.

To stop the hydraulic pump in an emergency press one of the two emergency stop buttons located on the unit. Under normal conditions turn the main switch on the control box to the OFF position.



6.0 Troubleshooting

Repairs must be performed in a dirt-free environment by qualified personnel familiar with this equipment.

Problem	Cause	Solution
Generator will not start	1. Fuel valve OFF	1. Move lever to ON position
	2. Choke OPEN	2. Move lever to CLOSED position unless warm
	3. Engine switch OFF	3. Turn switch to ON position
	4. Out of fuel	4. Refuel
	5. Spark plug faulty	5. Replace spark plug
	6. Flooded engine	6. Dry and reinstall spark plug. Start engine with throttle lever in MAX position
	7. Fuel filter restricted	7. Repair by authorised service dealer
	8. Carburettor malfunction	8. Repair by authorised service dealer
	9. Ignition malfunction	9. Repair by authorised service dealer
Generator lacks power	1. Filter element(s) restricted	1. Clean or replace filter element(s)
	2. Bad fuel	2. Drain fuel tank and carburettor and refuel
	3. Fuel filter restricted	3. Repair by authorised service dealer
	4. Carburettor malfunction	4. Repair by authorised service dealer
	5. Ignition malfunction	5. Repair by authorised service dealer
Pump does not operate	1. Main isolator switch OFF	1. Switch main isolator ON
	2. Unit is not plugged in	2. Plug unit in
	 Emergency stop button has not been reset 	3. Reset emergency stop buttons and press reset button on the control box
	4. Swaging guard open	4. Close the swaging guard
Pump is not delivering oil or delivers only enough oil to advance hydraulic ram partially or erratically	1. Low fluid level in reservoir	1. Check fluid level in accordance with Section 3.2
	2. Air trapped in system	2. Remove air from system in accordance with Section 3.3
	3. Loose coupler	3. Check all couplers
	4. Contaminated oil	4. Repair by authorised service dealer
	5. Relief valve or low pressure valve out of adjustment	5. Repair by authorised service dealer





Figure 4: Non-Swaged End Fitting





End Fitting with Nut

Figure 6: Attachment of End Fitting to Cross Bar





Figure 7: Control Box



Guard in Open Position

Allen Key to Rotate Roller Dies

Figure 8: End Fitting and Guard in Open Position





Pendant Control

Guard in Closed Position

Figure 9: End Fitting and Guard in Closed Position



Emergency Stop

Figure 10: Emergency Stop Button



Figure 11: Swaged End Fitting

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For more information



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