

SOLUTIONS FOR THE REPAIR RENOVATION AND DECOMMISSIONING OF PIPELINES



Large Pipe Handler Operating Instructions

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1. INTRODUCTION

Since its foundation in 1981, Steve Vick International has been at the leading edge of trenchless techniques for the repair and renovation of underground **gas** distribution pipes.

In the UK, we are a major supplier to the gas distribution networks and many of our techniques have become accepted practice in the industry. We constantly seek to provide our customers with renewal methods which will minimise their costs and maximise their production.

The company has been supplying pipe handler equipment to the **water** utilities and their contractors for over 20 years. More recently we have entered the market with pipe cutting equipment and our sealant technology has been successfully adapted for use in the waste water sector.

In 2014 the company relocated and can be found at:

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2. PRODUCT DESCRIPTION

The Large Pipe Handler is designed to attach to a 5 - 11 tonne digger, depending on which size PE pipe you are inserting into the host pipe. It can also manoeuvre pipe around site where the entire operation is controlled from the cab of the mini excavator reducing manual handling.

This model handles pipe diameters from 355mm to 900mm, and depending on the size pipe will determine the size digger you require.

SPECIFICATION				
Model	355	500	630	900*
Size of excavator/digger	5 - 8 tonnes	8 tonnes	8 tonnes	8 - 11 tonnes
Maximum Pipe Diameter	180mm	400mm	560mm	900mm
Typical pushing speed	10 metres per minute	10 metres per minute	10 metres per minute	Not to be used for inserting pipe For handling PE pipe only
Typical length pushed	150 - 500m plus	150 - 500m plus	150 - 500m plus	Not to be used for inserting pipe For handling PE
For handling PE pipe only				
Length	720mm	720mm	720mm	720mm
Max width with shells extended	720mm	880mm	1050mm	1360mm
Max height with large shells	800mm	930mm	1030mm	2120mm
Weight	340KG	380KG	440KG	490KG

Table 1 - Large Pipe Handler Specifications

PUSHING CAPACITIES - Pushing forces experienced onsite will vary depending on the make and model of excavator being used. The pushing force is related to the arm tear - out force which is the maximum force achievable from the excavator where the pipe is inserted by pulling the pipe towards the excavator rather than away. It is still possible to push pipe in by pushing away from the excavator however pushing forces will be smaller.

* The 900 Pipe Handler is designed for handling **PE** Pipe only and must **not** be used for inserting or pushing PE pipe.

2.1 LARGE PIPE HANDLER HIGHLIGHTS

Pipe Handler connects to arm of 3CX type excavators.	Load or unload from storage tacks or lorries.
Pushed at speeds up to 10 metres per minute.	Can be shelled down for use with smaller diameter pipes.
Lengths in excess of 500 metres can be pushed at any one minute.	Simple to use—similar driving technique to ‘grading’.
Machines powered from the third service off take hydraulic power source on excavators.	Very robust construction—designed for use in pipe laying environment.
The Pipe Handler does not require any anchoring - soft ground conditions no longer an issue and anchoring pins are not needed.	Can push or pull pipe.

Table 2 - Large Pipe Handler Key Points

3. SAFETY AND PRECAUTIONS

3.1 The following PPE must be worn at all times:

Safety goggles

Hard hat

High visibility jacket

Gloves

Steel toe cap footwear

3.3 All excavation work shall be carried out in accordance with relevant procedures for excavations and all other related codes of practice.

3.4 Ensure there is a designated banksman to control all operations of the excavator.

3.5 Ensure that the attachment and detachment of the Large Pipe Handler to and from the excavator is taking place within the cordoned off area.

3.6 Ensure that all the pipe handling, manoeuvring and pipe insertion activities using the excavator are taking place within the cordoned off area.

3.7 Ensure the movement of the excavator arm is contained within the cordoned off area.

3.8 The driver shall operate the excavator and Large Pipe Handler from the cab at all times.

3.9 Check that the Safe Working Load of the excavator is not exceeded by the combined weight of the Large Pipe Handler and the PE pipe being handled.

3.10 Check there are no overhead lines in close proximity to the lifting position.

3. SAFETY AND PRECAUTIONS (CONTINUED)

3.11 Check that all of the fittings and attachments required to correctly attach the Large Pipe Handler to the excavator are available.

3.12 Only lift PE pipe and do not attempt to lift anything else for example curb stones, as this will damage the Large Pipe Handler and may exceed the Safe Working Load of the excavator.

SIZE OF EXCAVATION REQUIRED				
PE Diameter	Minimum total length (m.)			Width (mm)
	Up to 1m. of cover	1m. To 2m of cover	2m. To 3m. of cover	
125mm 140mm	5	6	7	750
180mm 213mm	6	7.5	8.5	800
250mm 268mm	7	9	10	900
315mm 355mm	8	10	12	1200
400mm	9	12	13.5	1250
500mm	10.5	13.5	15.5	1300
900mm	14	17.5	19.5	1700

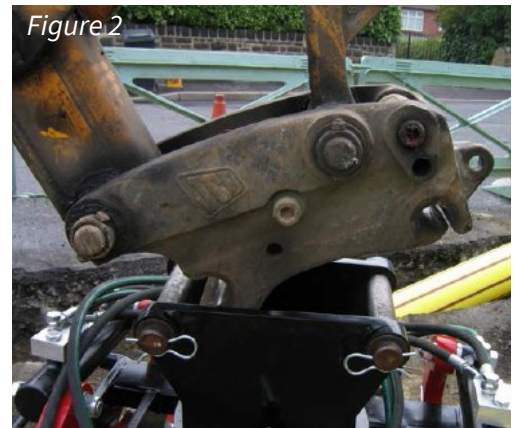
Table 3 - Excavators Required

4. FITTING PIPE HANDLER TO EXCAVATOR

4.1 Unload the Pipe Handler onto stable horizontal ground within the cordoned-off area. Position the excavator so that the arm can be lowered on to the Pipe Handler. Unlock the horizontal swivel to help line up the Pipe Handler with the arm of the excavator.

Locate the excavator in the desired position for pipe pushing and lower the stabilizers and if possible arrange the stack of PE pipes so that they can be picked up and loaded into the Butt Fusion M/C using the Pipe Handler in a stationary position with its stabilizers down.

The Pipe Handler can be fitted to the excavator using either Quick Hitch or Standard Bucket Pins. If using a quick hitch, then all safety devices, pins, locks etc. must be fitted and **checked by the machine operator before using the handler.**



4.2 INSTALLATION OF CONTROL EQUIPMENT: Safety locking pin in place when quick hitch has been attached. **This must be locked in before any lifting of the Pipe Handler is carried out.**

*Please note that if your chosen excavator is fitted with dual flow hydraulics then the electrical system below is not required. Simply plug the hoses running from the Pipe Handler directly into the quick release coupling on the excavator boom and ensure the tap for dual flow is switched on.

In order for single flow hydraulic excavators to operate the Pipe Handler an electrical system is required which is as follows:

Solenoid Control Valve (SCV) which directs the oil flow so that the hydraulic rams on the Pipe Handler will operate correctly.

Switch Control Box (SCB) remotely controls the Solenoid Control Valve from the cab of the excavator and is operated by the driver.

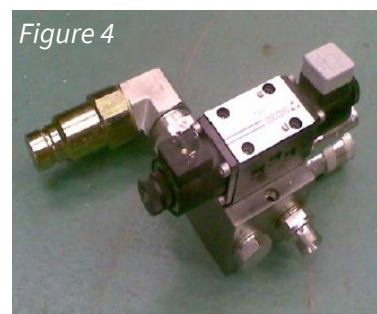
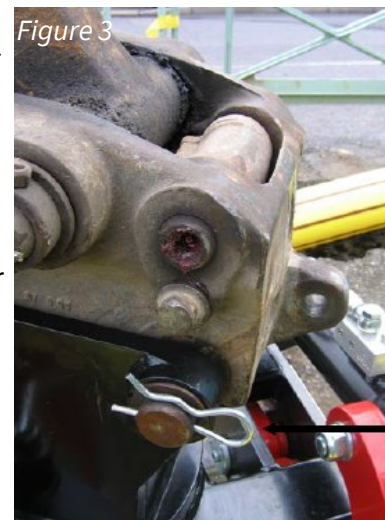


Figure 5

4.2 INSTALLATION OF CONTROL EQUIPMENT (CONTINUED)

The Solenoid Control Valve is plugged into the return line on the excavator boom, usually an inch flat-face coupling (most hydraulic breakers use but check this if first time fit).

The supply line should be a 3/4 inch flat-face coupling, which is on the end of the flexible hydraulic hose (check this is first time fit).



Figure 6



Figure 7



Figure 8

Other side of excavator boom

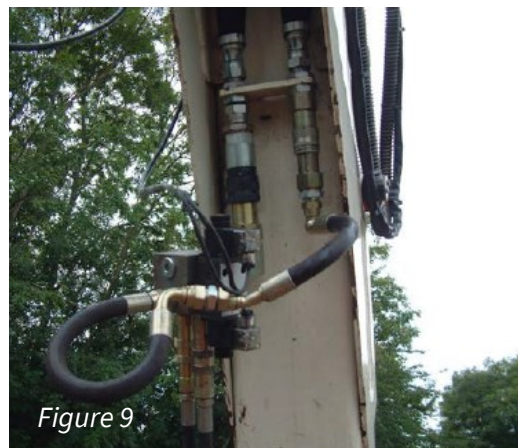


Figure 9

Alternative location of the off-take valve

The control cable from the SCV should be routed down the excavator arm, following the breaker hose route if possible. Ensure enough slack is in the cable to allow the arm to move without cutting or stretching the cable. Secure with nylon ties to the rubber hoses rather than the steel line which will help prevent heat transfer damage to the boom.



Figure 10

Excess control cable should be at the cab end of the boom, and neatly secured to avoid a trip hazard with the switchbox comfortably placed for the operator to control.

4.2 INSTALLATION OF CONTROL EQUIPMENT (CONTINUED)

The unit is powered up by inserting the power jack plug into the vehicle cigar lighter or aux power jack, the plug is converted by removing the red plastic shroud on the end.

An electrical operation check can be made by operating the SCB when plugged in and checking the solenoid valve pack, each solenoid is equipped with an L.E.D. which lights when the corresponding switch is pressed; this will verify that the electrical circuit is ready to operate.



Figure 11

The final connection to be made is the 3/8 inch flat-face hose connections from the Pipe Handler to the SCV. There are male and female and they should be pushed together and the locking collars rotated to prevent accidental disconnections.

The 3/8 inch hoses are sufficiently long to allow the excavator to use its extended boom function if needed, however when using a short or standard length boom then they should be coiled and secured with a nylon tie to prevent entanglement.

The installation should now be checked slowly for full un-restricted movement over the full operating range of the excavator arm, any cable or hose fouling should be rectified before deployment.

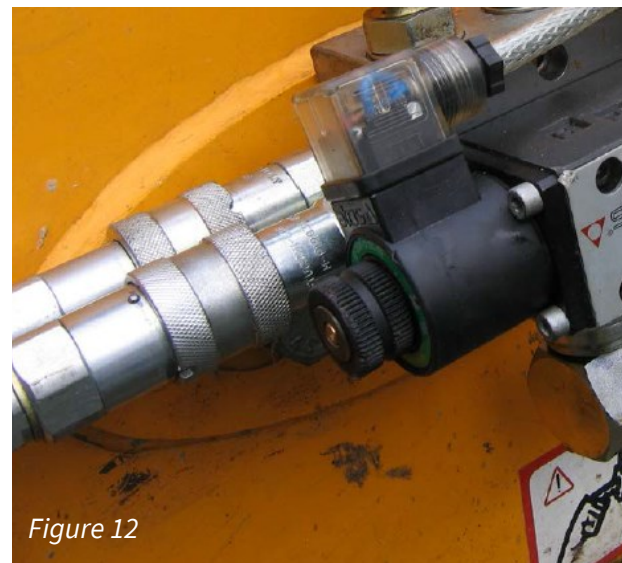


Figure 12

4.3 OPERATING THE PIPE HANDLER: In brief—The Pipe Handler hydraulics are powered by the breaker service on the boom, to operate the handler press the direction button on the SCV and then depress the foot- pedal.

This causes the oil to flow around the Pipe Handler ram circuit and open/close the grab arms as required.

Once the Pipe Handler has fully grabbed the pipe, then the push button and foot pedal can be released as the Pipe Handler has been fitted with pilot valves, which maintains the clamping force. The operator can then concentrate solely on manoeuvring the pipe. To release, operate the SCB and then the foot pedal.



Figure 13

4.3 OPERATING THE PIPE HANDLER (CONTINUED)

BEFORE ATTEMPTING TO INSERT PE PIPE ENSURE THE SWIVEL LOCKING PIN IS RAISED ALLOWING THE HANDLER TO MOVE FREELY AROUND THE PIPE.

1. To open the grab arms press OPEN button on the SCB and press down on the breaker foot pedal.
2. This will fully extend the grab arms.
3. The foot pedal and OPEN button can now be released.
4. Manoeuvre the Pipe Handler around the PE stick/string at a location that will give the safest most effective stroke.
5. To clamp around the PE, again press the CLOSE/GRIP button until the grab arms have wrapped around the PE.
6. As the Pipe Handler is pulled back towards the excavator, it will be necessary to employ a similar technique to that of grading in order to keep the pipe and Pipe Handler in line and prevent any undue stress on either the Pipe Handler or pipe string.
7. As the Pipe Handler is pulled back towards the excavator, it will be necessary to employ a similar technique to that of grading in order to keep the pipe and Pipe Handler in line and prevent any undue stress on either the Pipe Handler or pipe string.
8. Be aware that during the insertion, the PE pipe may spring back when opening the Pipe Handler shells. All operative are not to be in the trench at any time during the insertion.
9. Repeat procedures 1-8 to begin the next stroke and continue inserting pipe.



Figure 14

4.3 CHANGING SHELLS: Once Pipe Handler is fully attached to the arm of the excavator lift the Pipe Handler up off the ground. Shells can now be fitted or removed with the Pipe Handler at a good working height.



Figure 15

5. GENERAL MAINTENANCE: The Pipe Handler has been designed to be relatively free of maintenance, simple checks on the tightness of the arm pivot bolts and swivel pin bolts being all that is required in a normal day to day operation.

5.1 SERVICE AND MAINTENANCE: Before a push the following servicing should be done.

ROUTINE MAINTENANCE	
Clean down the machine and check all moving parts for wear and tear.	
Check all hydraulic joints and couplers for leaks.	
Check all hydraulic hoses are in good condition.	
Check the following bolts are tool tight: - 24 x M16 bolts attaching swivel yoke to main body. 8 x M12 bolts securing arms to main body.	
Check the following bolts are hand tight: 4 x M24 bolts securing hydraulic rams to arms. 8 x M12 bolts securing aluminium shells to arms.	
The three type of bolts used on the Pipe Handler are M12 and M16 cap heads and M24 hexagon bolts.	

6. OPERATING THE PIPE HANDLER

If at any time the PE needs to be pulled back (obstacle, site requirements) the operation is exactly the same only the excavator arm is either extending away from the host pipe whilst gripping the PE or the excavator can be repositioned in the opposite direction and the PE pulled out away from the host pipe.

The Pipe Handler is equipped with a lockable swivel between the arm and the handler chassis; this is normally left un-locked for pipe insertion to allow the Pipe Handler to conform to slight misalignment of the PE without placing undue strain on either the Pipe Handler or PE.

7. TRANSPORTING THE PIPE HANDLER

It is perfectly possible to transport the Pipe Handler to and from site attached to the JCB 3CX. When driving with the handler it should be locked down with the swivel pin and positioned long ways in the opposite manner to the pushing position. This will keep the rams free from damage when the machine is crowded fully into the boom which keeps the KCB3CX as stable as possible in transport.

8. TRANSPORTING STICKS OF PIPE

It is perfectly possible to transport sticks of pipe from a stack on site to a position of insertion ready for welding. Once a stick of pipe has been selected it can be brought tight alongside the JCB 3CX to reduce the length and width of the operation. Once in position the swivel pin should be locked down to eliminate the risk of the pipe unduly swinging out.