

# EIOFIT

Polyethylene Fittings

Instructions Manual



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**THE COMPANY DOES NOT TAKE RESPONSIBILITY FOR ACCIDENTS WHEN SAFETY PROCEDURES ARE NOT FOLLOWED.**

**RECOMMENDATIONS FOR DISPOSAL:** POLYETHYLENE USED IN OUR PRODUCTS IS RECYCLABLE: DISPOSE THROUGH AUTHORIZED CENTERS. DO NOT DISPOSE OF WRAPPING AND PACKAGING OF THE PRODUCT, RECYCLE THROUGH COLLECTION.

**RECOMMENDATIONS FOR STORAGE:** STORE THE FITTINGS IN A DRY PLACE, AWAY FROM DIRECT SUN LIGHT, WITH TEMPERATURES BETWEEN -20°C (-16 °F) AND 50°C (122 ° F).



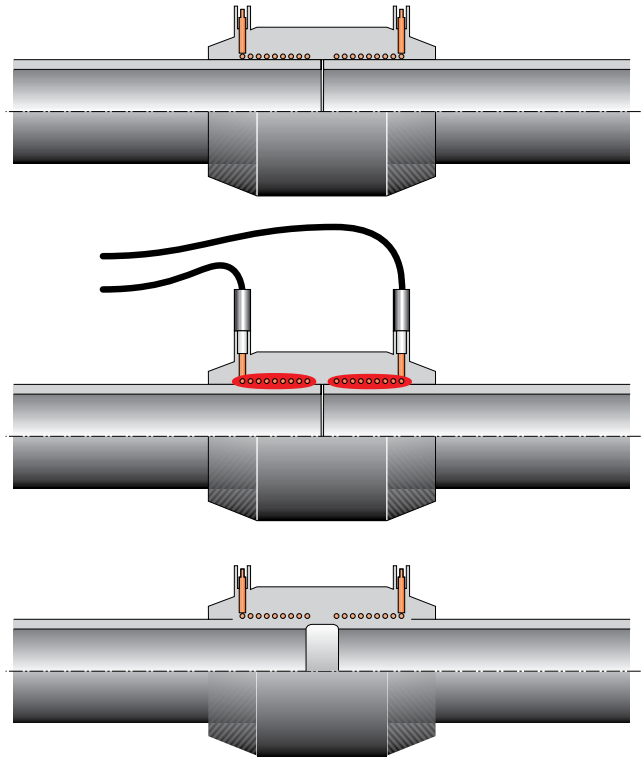
# 1. THE ELECTROFUSION PROCESS

The ELOFIT system is based on **ELECTROFUSION-WELDING**.

The fittings have a resistive wire inside which is connected to the outside cable terminals.

When voltage is applied, this resistance generates the heat needed to melt polyethylene. Energy is directly transmitted at the interface between the fitting and the pipe causing heat welding of the parts. When it cools down, the joint is even, strong, safe and reliable.

The main features of ELOFIT are the high quality and the reliability of the joints.





**1**



# 2. HOW TO READ THE BARCODES

# 2

## WELDING BARCODE

According with ISO13956.

Scan the barcode with the barcode scanner or manually enter the welding parameters of time and voltage reported on the barcode.



WELDING BARCODE

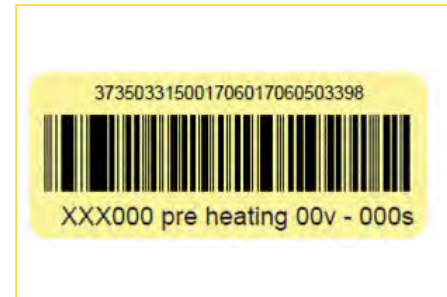
## PRE HEATING BARCODE

FOR FITTING DIAMETERS  $\geq 8$ " IPS - 225mm.

First scan this barcode when the gap between the coupler and the pipe or spigot end is greater than 0.08" (2 mm) at any point of the circumference.

Repeat the preheating process a maximum of THREE TIMES to reduce the gap between the pipe and the fitting.

First scan this barcode also when the temperature is less than 32°F (0°C) and the gap is lower than 0.08" (2 mm). THE PROCESS MUST BE PERFORMED ONLY ONCE.



PRE HEATING BARCODE

## DOUBLE BARCODE

In case of double barcode (FIRST WELDING and SECOND WELDING), the welding process must always be performed scanning the first welding parameters and the second welding parameters immediately after the completion of the first welding (with no cooling time between them).



DOUBLE BARCODE

**YOU CAN WELD WITH POLYVALENT WELDING UNIT IN AUTOMATIC MODE (WITH BARCODE SCANNER) OR IN MANUAL MODE.**

**IN CASE OF AUTOMATIC WELDING, ALWAYS CHECK TIME AND VOLTAGE PARAMETERS ON THE DISPLAY AFTER BARCODE SCAN.**

**IN CASE OF MANUAL WELDING, USE TIME AND VOLTAGE PARAMETERS INDICATED ON THE BARCODE.**

**IF THE WELDING UNIT DOES NOT PERFORM WELDING TIME COMPENSATION ACCORDING TO AMBIENT TEMPERATURE, USE THE PARAMETERS ON THE LABEL AFFIXED ON THE BAG.**

**KEEP AT A SAFE DISTANCE DURING WELDING.**



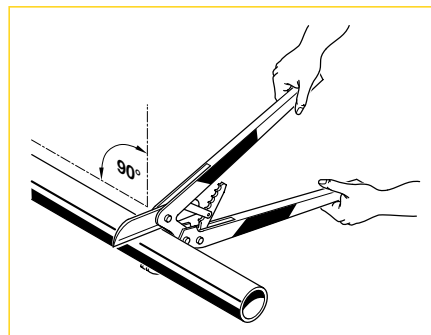
BAG LABEL



2

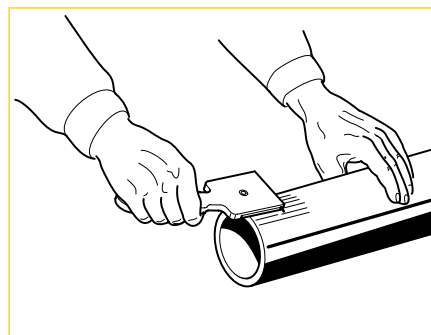
### 3. PREPARATION OF THE PIPE

1. Cut the pipe at right angles with a pipe cutter.

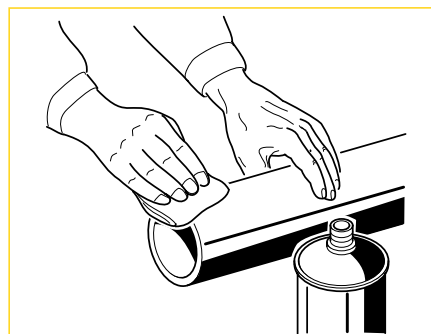


2. Scrape the pipe or spigot surface up to 0.4" (1 cm) beyond the insertion length of the fitting, to remove the oxydized PE layer.

Mechanical scrapers are recommended. Hand scrapers can be used (refer to your Company procedures).



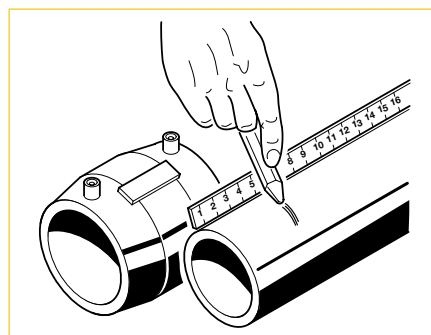
3. Remove any mud, dust, grease or other traces of dirt from the pipe or spigot ends and the welding area of the fitting. Use only isopropanol and a soft wiping cotton cloth without any printing.



4. Wait until the cleaned parts are completely dry, then mark the welding length on the pipes or spigot ends with a marker pen.

5. Insert the pipe or spigot ends straight into the fitting up to the marked insertion length.

6. Install the aligners in order to keep straight position and avoid stresses during the welding.



**AVOID ANY STRESS ON THE WELDING AREA DURING THE WELDING CYCLE AND THE COOLING PHASE.**

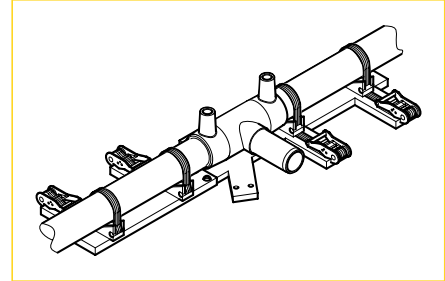


**3**

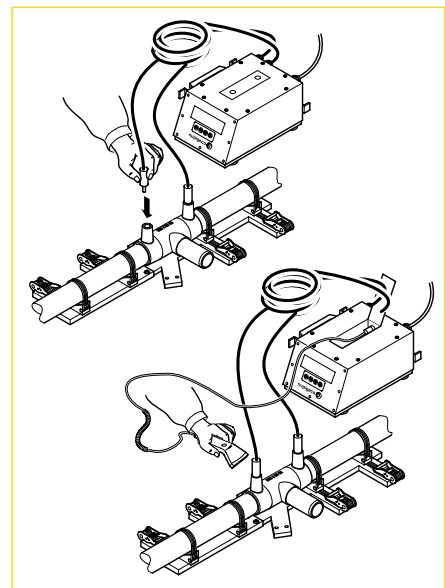


# 4. WELDING INSTRUCTION FOR ELECTROFUSION FITTINGS

1. Prepare the pipe and fitting to weld following the directions in Chapter 3. Make sure that the pipes or spigots to be welded are lined up and straight without any possibility of movement.

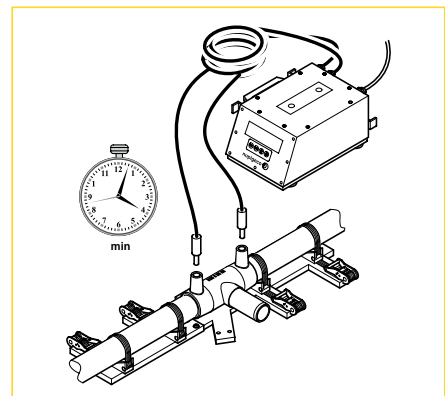


2. Connect the welding cables to the fitting connectors, scan the barcode with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2).



**ALWAYS CHECK THE WELDING PARAMETERS BEFORE STARTING THE WELDING CYCLE.**

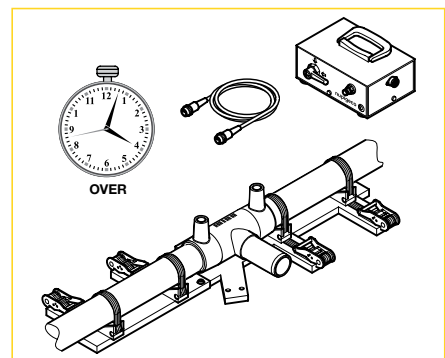
3. At the end of the welding cycle, disconnect the cables and wait for the cooling time indicated on the barcode.



4. The welding data can be downloaded by a USB drive pen or instantly printed through a printer.

The exact position of the installation can be recorded with the bluetooth GPS.

5. When the cooling time is over, remove the aligners and start the pressure test on the system by the pressure test unit (follow your company procedures).





4

# 5. PRESSURE TEST UNIT

After completing the welding process, wait for the cooling time (check the label on the fitting), then remove the alignment tool.

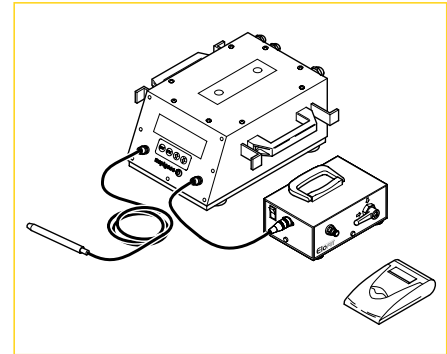
It is now possible to carry out the pressure test.

### NECESSARY EQUIPMENT:

- ELOFIT MULTIPURPOSE WELDING CONTROL UNIT FOR PRESSURE INSPECTIONS
- ELOFIT PRESSURE TEST UNIT FOR NETWORK INSPECTIONS UNDER PRESSURE
- COMPRESSOR OR NITROGEN TANK WITH SUITABLE PRESSURE ADJUSTMENT

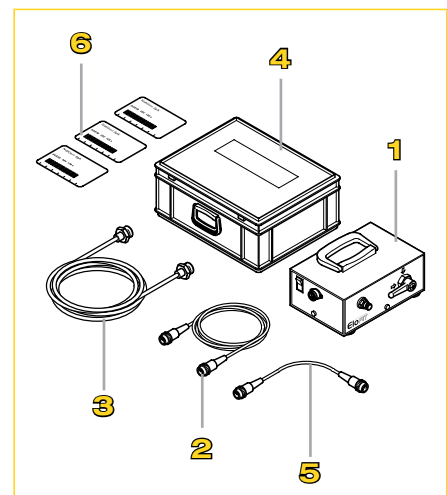
If necessary:

- PRINTER OR EXTERNAL UNIT FOR DOWNLOADING DATA



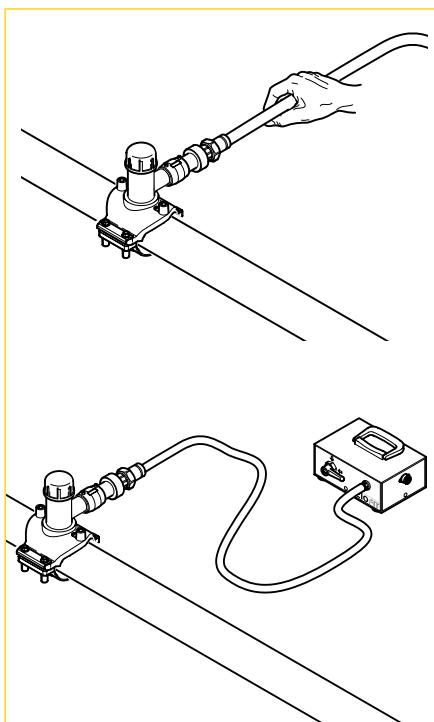
### LEGEND

1. Elofit pressure test unit
2. Unit connection cable
3. Pipe with two adapters for ø6mm Rilsan connection.
4. Carrying case
5. Unit adaptor cable
6. Test cards for pressure tests



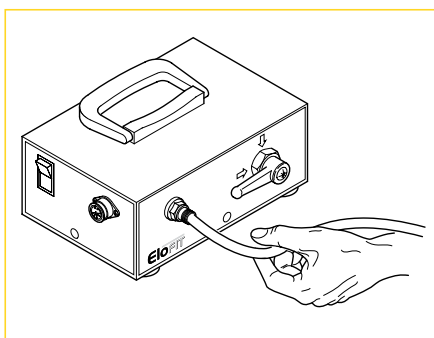
## 5.1 CONNECTIONS

Before beginning the test, equip any point on the line with a  $\varnothing$  6 mm RILSAN adaptor.



### 1. SYSTEM > PRESSURE GAUGE

Insert one end of the Rilsan tube into the quick connector in the pipe to be tested; the other end must be connected to the pressure testing device under the label “TO ELOFIT PIPEWORK”.



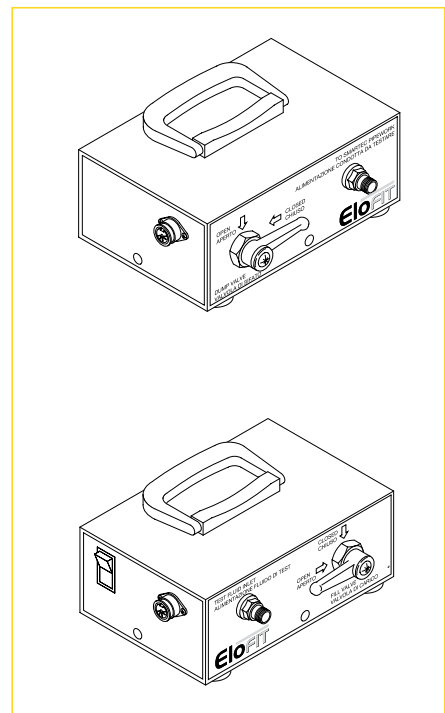
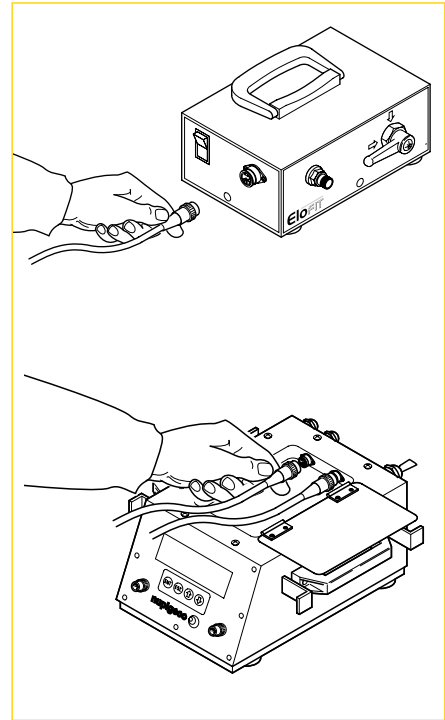
### 2. PRESSURE SOURCE > PRESSURE GAUGE

Connect the source of pressure fluid (air compressor or nitrogen tank) to the pressure gauge under the label “TEST FLUID INLET”.



### 3. PRESSURE GAUGE > UNIT

Connect the connection cable from the pressure gauge to the “DATA PORT” connection.



# 5

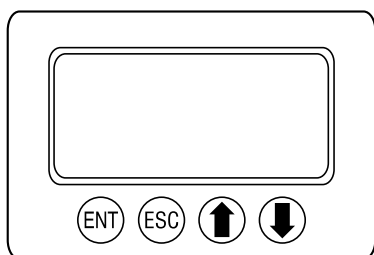
## 5.3 STARTING UP THE PRESSURE TEST



BEFORE BEGINNING THE PRESSURE TEST, VERIFY THAT:

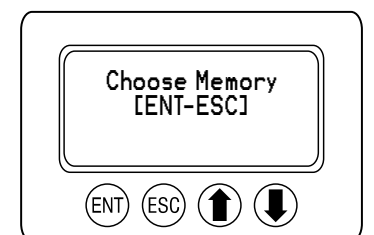
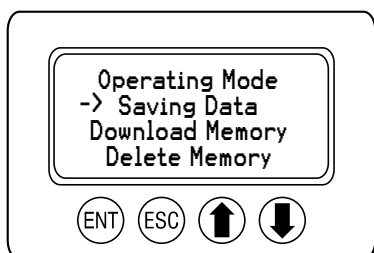
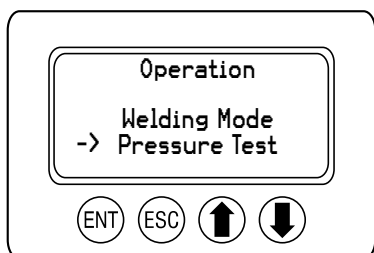
- THE HANDLE OF THE DUMP VALVE IS IN "CLOSE" POSITION.
- THE HANDLE OF THE FILL VALVE IS IN "OPEN" POSITION.

# 5



Data taken during pressure tests are saved in eight different memory slots; use the cursor up/down keys to select the memory slot and then press **ENTER** to confirm or **ESCAPE** to return to the previous menu.

The system will propose the first free memory slot available.



Choose the suitable **Test Card** (pressure test data cards) among those provided with the pressure gauge.

The Test Card contains the following data:

**IP:** Initial test pressure

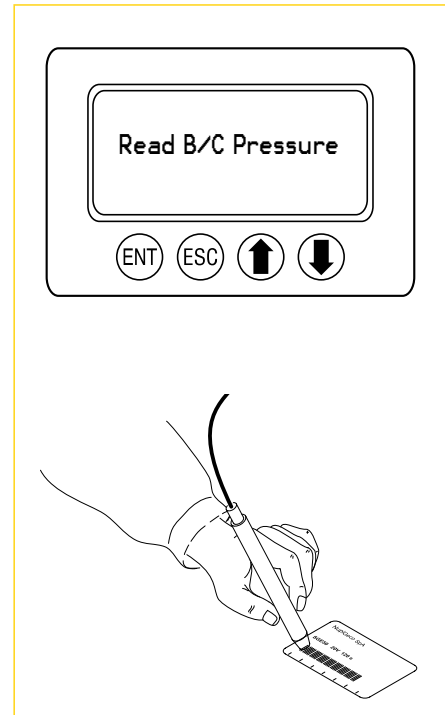
**FP:** Final test pressure

**Dur:** Total duration of test expressed in minutes or hours.

**Rate:** time lapse between two consecutive pressure and temperature data readings.

Ex: Dur 5 min / Rate 30 sec = 10 readings

The Barcode on the test card contains all the data for automatic scan by optical pen.



The Unit will summarize all test data on the following screen.

**MID:** Identification

**TID:** Test protocol

**NP:** Nominal test pressure.

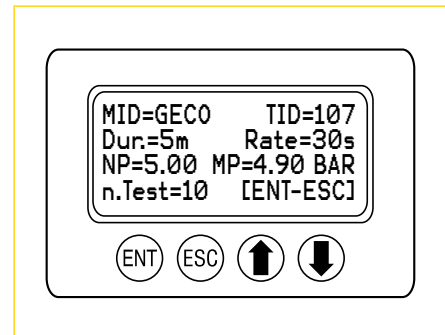
Values reported by the Unit may have a tolerance of  $\pm 2.5\%$  compared to the IP.

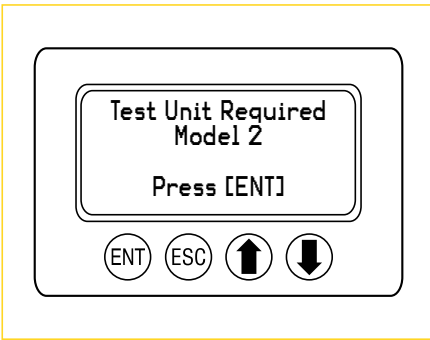
**MP:** Minimum test pressure allowed.

Below this value, the test is failed.

**n.Test:** Number of tests to be carried out

After having checked that the data is correct, press ENTER to continue or ESCAPE to cancel the operation.

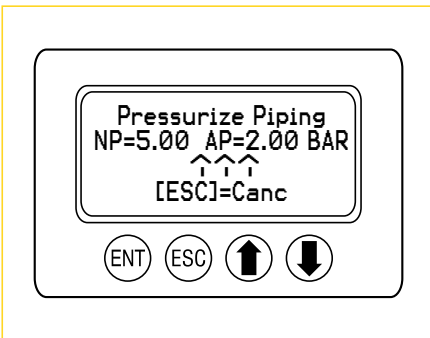




The Unit asks the operator to confirm that the pressure test unit connected to the welding machine is the right model. Check that the **ID number** printed on the box of the unit is the same as the one requested by the multipurpose welding machine and then press **ENTER**.

If the pressure test unit model is different from the one requested by the welding machine, contact the nearest ELOFIT Distributor or Nupi Technical Assistance E Wdh[UWz

# 5



At this point the pipe system can be put under pressure.

The following screen appears:

↑↑↑: Graphic signal that suggests pressure INCREASING

↓↓↓: Graphic signal that suggests pressure DECREASING

===: Pressure STABILIZED

To increase pressure, proceed as follows:

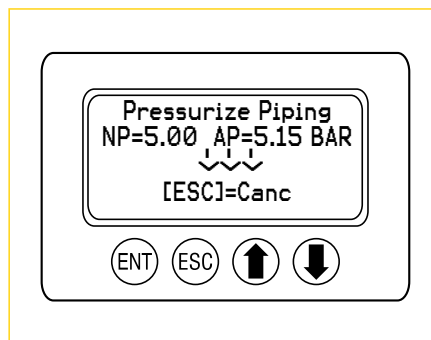
1. Close the dump valve on the pressure test unit.
2. Slowly open the fill valve on the pressure test unit, keeping it open until the pressure, that can be read on the screen, reaches the required test pressure (IP).



**ONCE THE SYSTEM IS FILLED, LET THE PRESSURE STABILIZE FOR 30-40 MINUTES.**

**THE INITIAL PRESSURE MAY HAVE A TOLERANCE OF ±2.5%.**

If the actual pressure (**AP**) is higher than the nominal test pressure required (**NP**), open the dump valve slowly.



Wait a few more minutes for the pressure to stabilize in the entire line.



The Unit is ready to begin the pressure test.

Press **ENTER**.

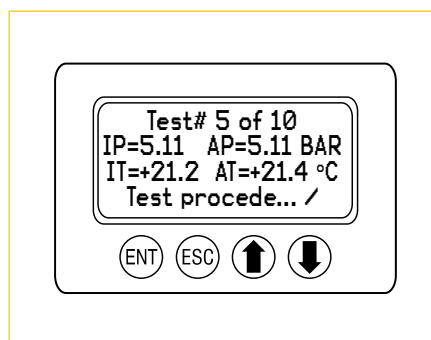
The progression of tests carried out is visualized in the first line.

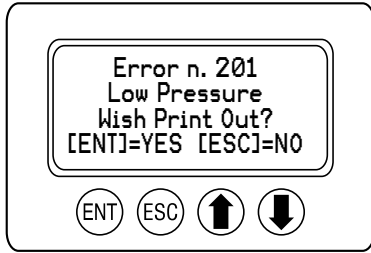
**IP**: Initial pressure

**AP**: Actual pressure

**IT**: Initial temperature

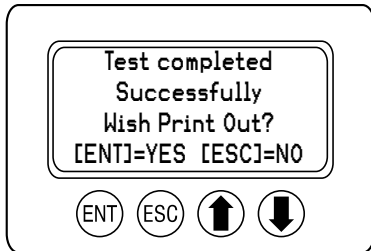
**AT**: Actual temperature





If during the test the pressure drops below the minimum allowed (**MP**), an error message will appear and will indicate “Test Failed”.

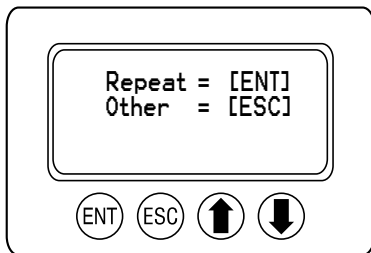
The test may be stopped at any time by pressing **ESCAPE**. In this case, an error message will appear on the screen.



If the test is completed with positive result, this message will appear on the screen.

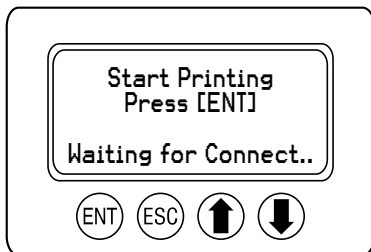
If you do not wish to print the test report, press **ESCAPE**.

**5**



The screen will appear as follows.

Press **ENTER** to go back to read the barcode for the test or press **ESCAPE** to return to data insertion.



If you wish to print the test report, turn on Nupi bluefaafZ printer linked to the Unit.

Press **ENTER** to start printing.

At the end of the pressure test, discharge the line by slowly opening the dump valve.

The reports for both welding and pressure test can be transferred by the external data download unit provided by Nupi and managed on the PC by the Data Downloading Software contained in CD-ROM Elofit Download Program.

Download data on a PC will be carried out by following the instructions provided with the relative equipment.

- **Cancelling the test reports**

Select “Cancel Memory” option to cancel the contents of a specific memory slot.

Press **ENTER** to continue or **ESCAPE** to return to the main menu.

Select the memory slot to be cancelled by using the up/down keys and then confirm the selection with **ENTER**.

Press **ENTER** to confirm the cancellation or **ESCAPE** to return to the previous screen.

All the data will in any case be saved in the Unit in order to be downloaded to a PC later.



## GLOSSARY

<b>ENT</b>	Enter (confirm).
<b>ESC</b>	Escape (return to previous screen).
<b>B/C</b>	BarCode
<b>Is printed ON</b>	The barcode for the pressure test is printed on the TEST CARDS and contains all the parameters for automatic transfer by the optical pen.
<b>IP</b>	Initial test pressure required (data contained on test card).
<b>PF</b>	Final test pressure required (data contained on test card).
<b>NP</b>	Nominal test pressure. Values reported by the Unit. May have a tolerance of $\pm 2.5\%$ compared to the IP.
<b>MP</b>	Minimum test pressure allowed. Below this value, the test is failed.
<b>AP</b>	Actual pressure. Values reported by the Unit during the test.
<b>Dur</b>	Total duration of test expressed in minutes or hours (data contained on test card).
<b>Rate</b>	Interval between one reading and the next during the pressure test (data contained on test card).
<b>MID</b>	Identification of the memory
<b>TID</b>	Test protocol
<b>n.Test</b>	Number of tests carried out
↑↑↑	Pressure INCREASING
↓↓↓	Pressure DECREASING
===	Pressure STABILIZED
<b>IT</b>	Initial test temperature
<b>AT</b>	Actual temperature



# 6. COOLING TIMES AND PRESSURE TEST RECOMMENDATIONS

WHEN COMPANY PROCEDURES ARE NOT SPECIFIED, REFER TO THE FOLLOWING TABLES FOR THE RECOMMENDED WAITING TIMES BEFORE STARTING THE PRESSURE TEST.

## ELECTROFUSION FITTINGS

Table 1

COOLING TIME		
∅		MINUTES
inch.	mm	
1/2" to 1 1/2"	20 ÷ 50	10
2" to 2 1/2"	63 ÷ 75	15
3" to 6"	90 ÷ 200	20

Table 2

WAITING TIME BEFORE PRESSURE TEST START			
∅		MINUTES	
inch.	mm	P < 87 psi	P < 348 psi
		6 BAR	24 BAR
1/2" to 1 1/2"	20 ÷ 50	20+cooling time	60+cooling time
2" to 2 1/2"	63 ÷ 75	30+cooling time	90+cooling time
3" to 6"	90 ÷ 200	40+cooling time	120+cooling time

## COUPLERS ≥ 8" - 225 mm

Table 3

COOLING TIME		
∅		MINUTES
inch.	mm	
8" to 18"	225 ÷ 450	40
20" to 24"	500 ÷ 630	60
30" to 32"	710 ÷ 800	90

Table 4

WAITING TIME BEFORE PRESSURE TEST START			
∅		MINUTES	
inch.	mm	P < 87 psi	P < 348 psi
		6 BAR	24 BAR
8" to 18"	225 ÷ 450	60+cooling time	180+cooling time
20" to 32"	500 ÷ 800	80+cooling time	200+cooling time



**6**





## TAPPING TEES AND TAPPING VALVES

**Table 5**

COOLING TIME		
Ø		MINUTES
inch.	mm	
1 ¼" to 12"	40 ÷ 315	20

**Table 6**

WAITING TIME BEFORE PRESSURE TEST START			
Ø		MINUTES	
inch.	mm	P < 87 psi	P < 348 psi
		6 BAR	24 BAR
1 ¼" to 2"	40 ÷ 63	20+cooling time	30+cooling time
2 ½" to 12"	75 ÷ 315	20+cooling time	60+cooling time



## ZERO LEAKAGE TAPPING TEES

**Table 7**

COOLING TIME		
Ø main / service		MINUTES
inch.	mm	
1 ¼" x ½" - 12" x 1 ¼"	40/20 ÷ 315/40	20
3" x 2" - 12" x 2"	90/63 ÷ 315/63	30

**Table 8**

WAITING TIME BEFORE PRESSURE TEST START			
Ø		MINUTES	
inch.	mm	P < 87 psi	P < 348 psi
		6 BAR	24 BAR
1 ¼" to 2"	40 ÷ 63	cooling+20	cooling+30
2 ½" to 12"	75 ÷ 315	cooling+20	cooling+60

## TOP LOAD TAPPING TEES

(Ø 14" - 24" x 2") - (Ø 355÷630 / 63 mm)

**Table 9**

COOLING TIME		
Ø		MINUTES
inch.	mm	
14" to 24"	355 ÷ 630	40

**Table 10**

WAITING TIME BEFORE PRESSURE TEST START			
Ø		MINUTES	
inch.	mm	P < 87 psi	P < 348 psi
		6 BAR	24 BAR
14" - 24" x 2"	355 ÷ 630 / 63	cooling+30	cooling+90





## TOP LOAD TAPPING VALVES

Table 11

COOLING TIME		
∅		MINUTES
inch.	mm	
14" to 24"	355 ÷ 630	40

Table 12

WAITING TIME BEFORE PRESSURE TEST START			
∅		MINUTES	
inch.	mm	P < 87 psi	P < 348 psi
		6 BAR	24 BAR
14" - 24"	355 ÷ 630	cooling+30	cooling+90

**BRANCH SADDLES ∅ 1 1/4" x 1/2" - 12" x 4" (∅ 40/20 ÷ 315/125 mm), BAGGING SADDLES ∅ 3" - 12" (∅ 90 ÷ 315 mm)**

Table 13

COOLING TIME		
∅		MINUTES
inch.	mm	
1 1/4" - 12"	40 ÷ 315	20



Table 14

WAITING TIME BEFORE PRESSURE TEST START			
∅		MINUTES	
inch.	mm	P < 87 psi	P < 348 psi
		6 BAR	24 BAR
1 1/4" to 2"	40 ÷ 63	cooling+20	cooling+30
2 1/2" to 12"	75 ÷ 315	cooling+20	cooling+60

**BRANCH SADDLES FOR INSTALLATION WITH BELTS ∅ 8" x 6" - 32" x 8" (∅ 200/160 ÷ 1000/225 mm) - REPAIR SADDLES ∅ ≥ 14" (∅ ≥ 355 mm)**

Table 15

COOLING TIME		
∅		MINUTES
inch.	mm	
8" to 32"	200 ÷ 1000	40



Table 16

WAITING TIME BEFORE PRESSURE TEST START			
∅		MINUTES	
inch.	mm	P < 87 psi	P < 348 psi
		6 BAR	24 BAR
8" to 16"	200 ÷ 400	cooling+30	cooling+90
18" to 32"	450 ÷ 800	cooling+60	cooling+120



**TOP LOAD BRANCH SADDLES**  
 (ø 14" - 24" x 2") - (ø 355÷630 / 63 mm)

**Table 17**

COOLING TIME		
ø		MINUTES
inch.	mm	
14" to 24"	355 ÷ 630	40

**Table 18**

WAITING TIME BEFORE PRESSURE TEST START			
ø		MINUTES	
inch.	mm	P < 87 psi	P < 348 psi
		6 BAR	24 BAR
14" to 24" x 22"	355 ÷ 630/63	cooling+30	cooling+90

# 7. E/F COUPLERS $\emptyset \leq 6'' - 200 \text{ mm}$ , LONG COUPLERS, REDUCERS

1. Make sure that the pipe or spigot ends to be welded are lined up and straight.

2. Scrape the surface of the pipe or the spigot ends to remove the oxidized PE layer.

Scrape the length equal to the depth of the electrofusion fitting +0.4" (1 cm).

3. Clean the external surface of the pipe or spigot ends and the internal surface of the fitting with isopropanol and a soft wiping cotton cloth without any printing.

Wait until the clean parts are completely dry and mark the insertion depth on both segments of pipe.

4. Insert the pipe or spigot ends in to the electrofusion sockets until they reach the stop.

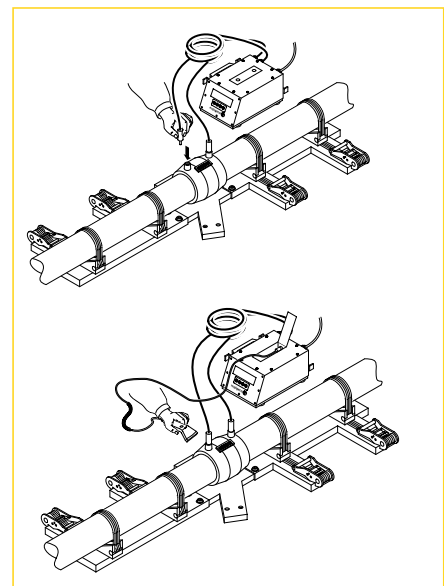
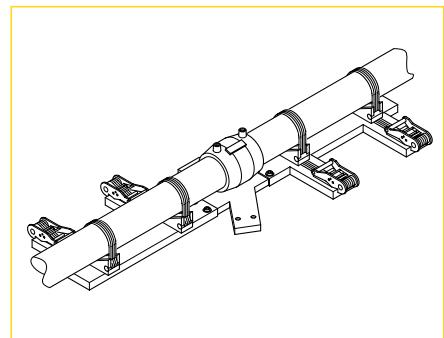
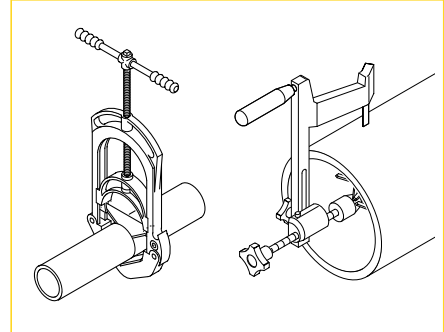
IT IS ALSO POSSIBLE TO REMOVE THE STOPS INSIDE THE FITTING AND INSERT THE FIRST PIPE COMPLETELY, THEN ALIGN THE TWO PIPE SECTIONS LEAVING ONLY A SMALL GAP BETWEEN THE PIPE ENDS AND SLIDE THE FITTING UNTIL IT IS CENTERED BETWEEN THE TWO LINES MARKED ON THE PIPE.

Check the achievement of the marked insertion depth.

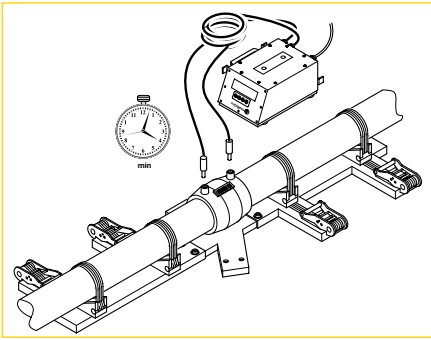
5. ALWAYS USE THE ALIGNERS (ACCORDING TO THE STANDARDS).

Avoid any stress in the welding area during the welding operation and the cooling time.

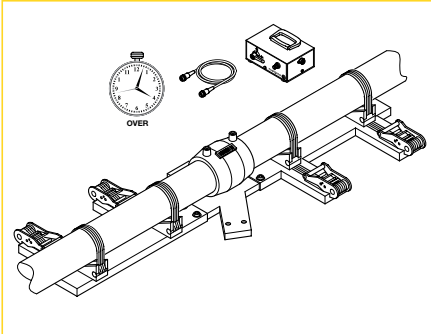
6. Connect the welding cables to the fitting connectors, scan the barcode with the barcode scanner or enter the welding parameters manually. (Refer to Chapter 2).



**ALWAYS DOUBLE CHECK THE WELDING PARAMETERS**



- 7.** At the end of the welding process, wait for the cooling time (see Table 1, pag. 23) indicated on the barcode.

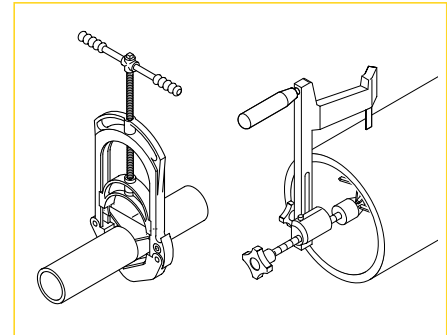


- 8.** When the cooling time is over, remove the aligners and start the pressure test of the system (See Chapter 5 and Table 2 pag. 23 or refer to your Company procedures).

# 8. E/F COUPLERS $\emptyset \geq 8'' - 225 \text{ mm}$

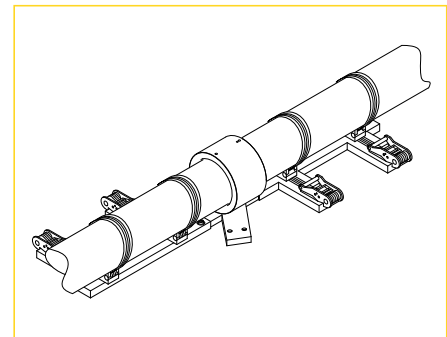


1. Make sure that the pipe or spigot ends to be welded are lined up and straight.
2. Scrape the surface of the pipe or the spigot ends to remove the oxidized PE layer. Scrape the length equal to the depth of the electro-fusion fitting + 0.4" (1 cm).
3. Clean the external surface of the pipe or spigot ends and the internal surface of the fitting with isopropanol and a soft wiping cotton cloth without any printing.



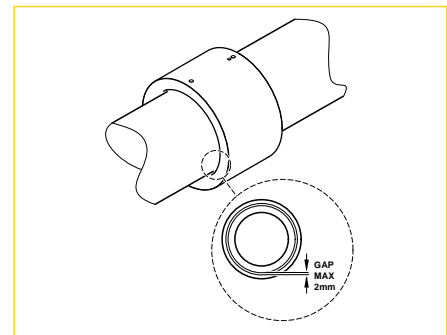
Wait until the clean parts are completely dry and mark the insertion depth on both segments of pipe.

4. Insert the pipe or spigot ends into the coupler. Make sure that they are perfectly lined up and positioned at the center of the fitting. Check the achievement of the marked insertion depth.
5. ALWAYS USE THE ALIGNERS (ACCORDING TO THE STANDARDS).



Avoid any stress on the welding area during the welding operations and the cooling time.

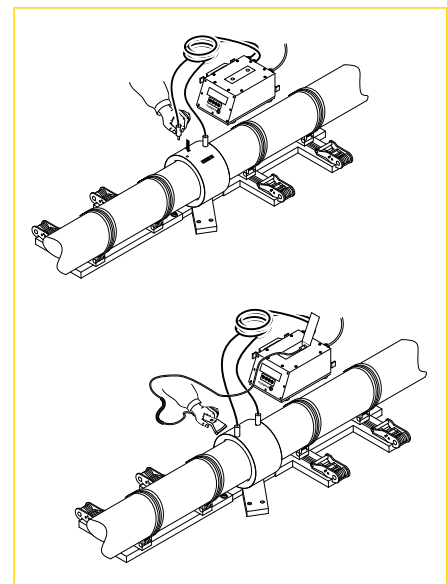
6. Connect the welding cables to the connectors of the fittings. If pre-heating is needed (check the following points), scan the yellow PRE-HEATING BARCODE with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2); otherwise skip directly to the following Step 7.

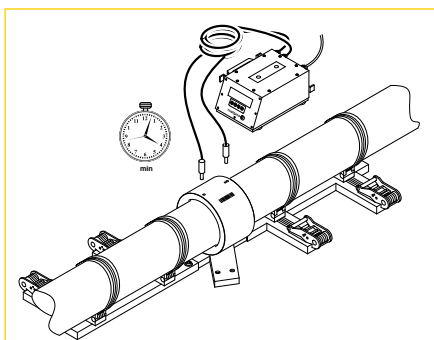


- a. Temperature more than 0°C and gap greater than 0.08" (2 mm): you must perform preheating to reduce the gap, you may try to reduce the gap by preheating a max of 3 times.

If you succeed and the gap is reduced to less than 0.08" (2 mm), then you can perform the welding operation. Otherwise, stop and call the supplier for technical support.

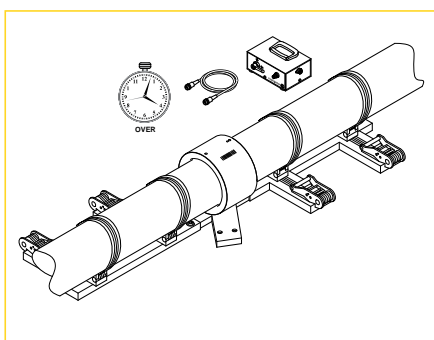
- b. No gap but temperature less than 32°F (0°C): you must perform preheating only 1 time, then weld immediately after.
- c. Gap > 0.08" (2 mm) and temperature less than 32°F (0°C): do exactly as in case a).





- 7.** Scan the welding barcode with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2). Always check the welding parameters on the display.

**In case of DOUBLE BARCODE, the welding process must be performed using the first welding parameters and the second welding parameters immediately after the completion of the first welding (with no cooling time between them).**



- 8.** At the end of the welding process, wait for the cooling time indicated on the barcode (see Table 3, pag. 23).
- 9.** When the cooling time is over, remove the aligners and start the pressure test of the system (See Chapter 5 and Table 4 pag. 23 or refer to your Company procedures).

#### FUSION INDICATORS

There are two different types of fusion indicators:

- **MECHANICAL FUSION INDICATOR:** it can be white or grey and comes out permanently from the outer diameter of the coupler when the welding cycle is performed.
- **THERMAL INDICATOR:** the small white square on the blue sticker attached next to the fusion connectors turns permanently grey when the welding cycle is performed.

THE FUNCTION OF THE FUSION INDICATORS IS TO SHOW THAT THE OPERATOR HAS PERFORMED THE WELDING CYCLE, IT DOES NOT GUARANTEE THE QUALITY OF THE JOINT.

**8**



**FOR  $\varnothing \geq 28''$  - 710 mm**

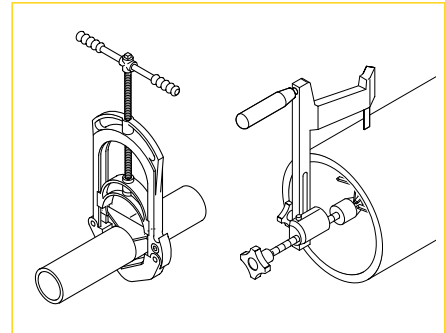
**YOU MUST USE TWO WELDING UNITS: ONE FOR EACH WELDING PROCESS.**



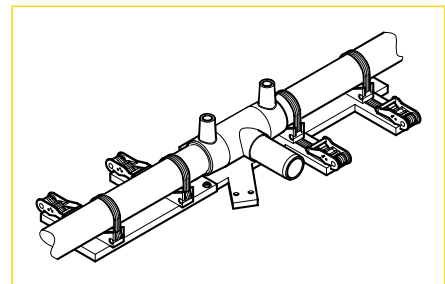
## 9. E/F TEES, REDUCED TEES, CAPS, 30° BENDS, 45° BENDS, 90° BENDS

1. Make sure that the pipe or spigot ends to be welded are lined up and cut straight.
2. Scrape the surface of the pipe or the spigot ends to remove the oxidized PE layer. Scrape the length equal to the depth of the electrofusion fitting + 0.4" (1 cm)
3. Clean the external surface of the pipe or spigot ends and the internal surface of the fitting with isopropanol and a soft wiping cotton cloth without any printing.

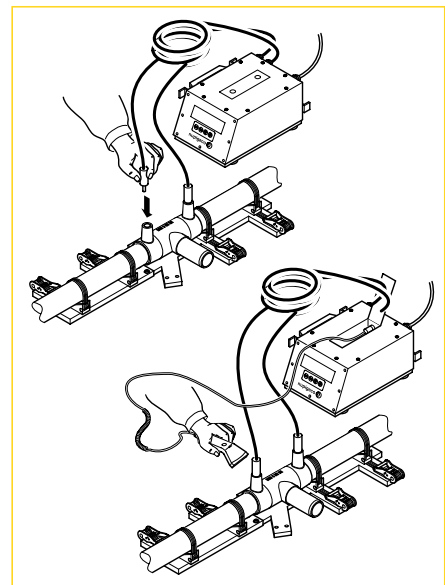
Wait until the clean parts are completely dry and mark the insertion depth on both segments of pipe.



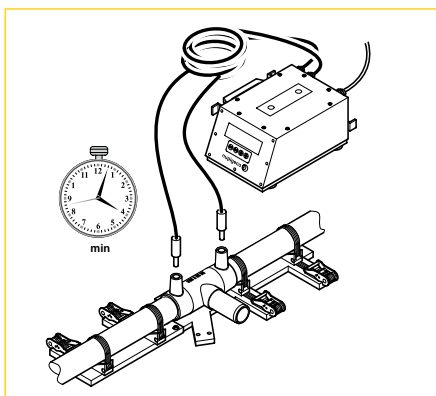
4. Insert the pipe or spigot ends into the electrofusion sockets until they reach a complete stop. Check the achievement of the marked insertion depth.
5. Avoid any stress in the welding area during the welding operations and the cooling time. ALWAYS USE THE ALIGNERS (ACCORDING TO THE STANDARDS).



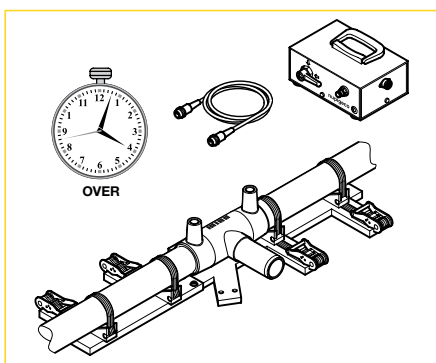
6. Connect the welding cables of the electrofusion machine to the fitting connectors, scan the **barcode** with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2).



**ALWAYS DOUBLE CHECK THE WELDING PARAMETERS**



**7.** At the end of the welding process, wait for the cooling time (see Table 1, pag. 23) indicated on the barcode.



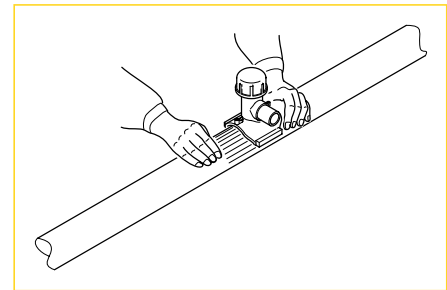
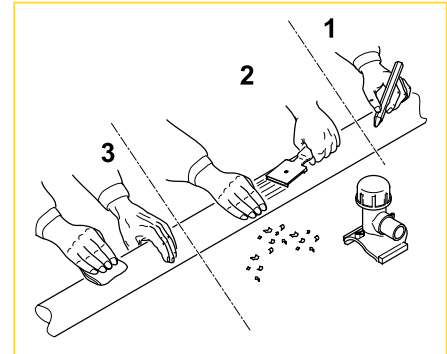
**8.** When the cooling time is over, remove the aligners and start the pressure test of the system (See Chapter 5 and Table 2 pag. 23 or refer to your Company procedures).

**9**

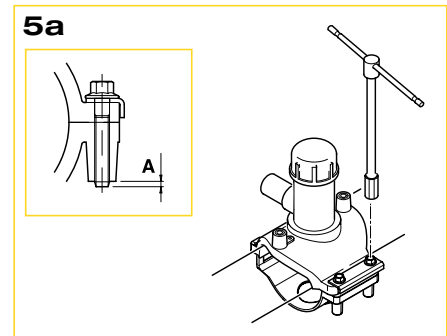


# 10. TAPPING TEES

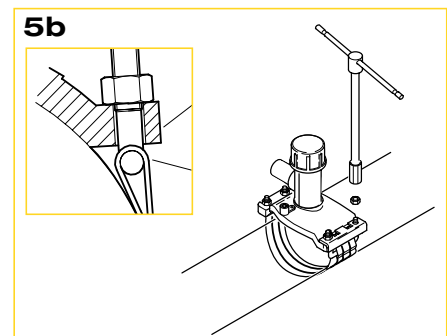
1. Mark the welding area on the main pipe with a wax crayon or marker.
2. Scrape carefully the surface of the pipe and the spigot of the outlet with a hand scraper to remove the oxidized PE layer.
3. Clean the external surface of the pipe, the spigot of the outlet and the welding area of the saddle with isopropanol and a soft wiping cotton cloth without any printing.  
Wait until the clean parts are completely dry; mark the insertion depth on the spigot of the outlet.
4. Apply the tapping tee on to the pipe watching out not to contaminate the previously cleaned surfaces.

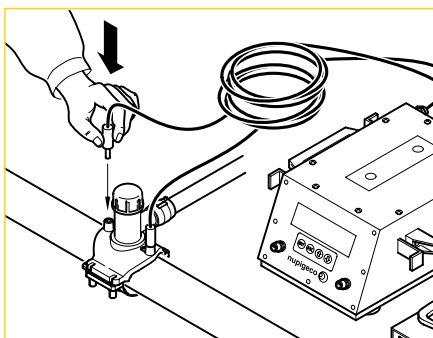


5. Fasten the tapping tee on the pipe using the integrated underclamp. Depending on models, there are two types of underclamp:
  - a. **QUICK-COUPLING RIGID UNDERCLAMP:** hook the square holes of the underclamp to the teeth on the upper part; line up the metal spacer and use a wrench to tighten the two screws until they are in position **A** in the lower part (feel the screws sticking out of the bottom).



- b. **FLEXIBLE BELT:** use a wrench to tighten the four screw nuts until the u-bolt **A** and the top part of tapping tee **B** come into contact.





6. Connect the service line at the spigot of the outlet, following the installation instructions for that specific fitting.

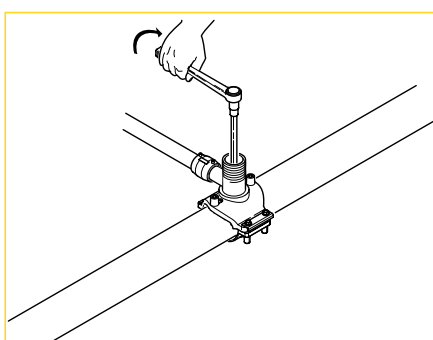
7. Connect the two cables to the welding connectors of the tapping tee, scan the barcode with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2).

After completing the welding process, verify that no material has leaked out of the joint between the pipe and the fitting and wait for the completion of the cooling time indicated on the barcode (see Table 5, pag. 24).

8. At the end of the cooling time, start the pressure test (See Chapter 5 and Table 6 pag. 24 or refer to your Company procedures).

9. When the pressure test is over, remove the top cap and start the perforation of the pipe using the cutter installed in the tapping tee; The CUTTER is designed to keep the coupon inside. Use an appropriate tool (\*) to screw down manually the cutter (turn clockwise) until the pipe has been drilled through, then move back the cutter to the upper position (turn counter clockwise).

(\*) A T-KEY WITH A HEXAGONAL MALE END OR A HEXAGONAL BAR WITH A RATCHET WRENCH.

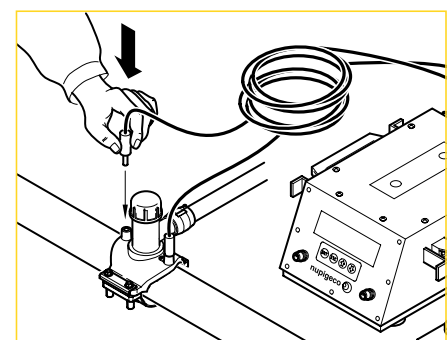
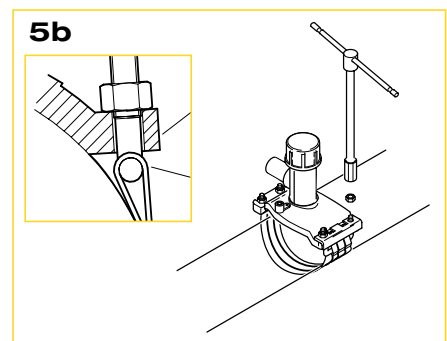
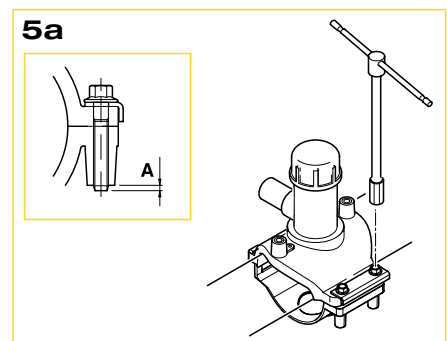
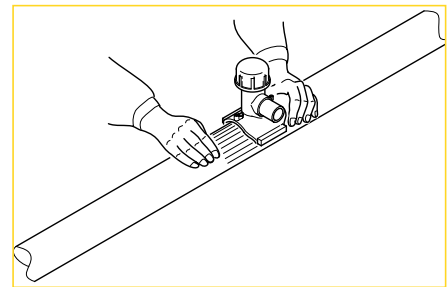
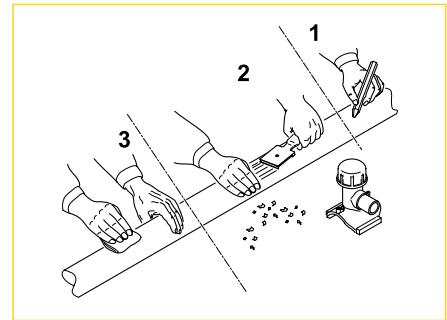


**KEEP THE BODY CLEAR OF THE FITTING DURING THIS OPERATION. DO NOT USE AUTOMATIC DRILLS. DO NOT REMOVE THE UPPER STOPPER.**

10. After the perforation is complete, replace the top cap and tighten down to the stopper (use the proper tool). The underclamp may be removed or left on permanently.

# 11. ZERO LEAKAGE TAPPING TEES

1. Mark the welding area on the main pipe with a wax crayon or marker.
2. Scrape carefully the surface of the pipe and the spigot of the outlet with a hand scraper to remove the oxidized PE layer.
3. Clean the external surface of the pipe, the spigot of the outlet and the welding area of the saddle with isopropanol and a soft wiping cotton cloth without any printing.  
Wait until the clean parts are completely dry; mark the insertion depth on the spigot of the outlet.
4. Apply the tapping tee on to the pipe watching out not to contaminate the previously cleaned surfaces.
5. Fasten the tapping tee on the pipe using the integrated underclamp. Depending on models, there are two types of underclamp:
  - a. **Quick-coupling rigid underclamp:** hook the square holes of the underclamp to the teeth on the upper part; line up the metal spacer and use a wrench to tighten the two screws until they are in position A in the lower part (feel the screws sticking out the bottom).
  - b. **Flexible belt:** use a wrench to tighten the four screw nuts until the U-bolt A and the top part of tapping tee B come into tight contact.
6. Connect the service line with the spigot of the outlet, following the installation instructions for that specific fitting.
7. Connect the two cables of the electrofusion machine to the connectors of the tapping tee, scan the barcode with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2). After completing the welding process, verify that no material has leaked out of the joint between the pipe and the fitting and wait for the completion of the cooling time indicated on the barcode (see Table 7, pag 24).
8. At the end of the cooling time, start the pressure test of the service line. (See Chapter 5 and Table 8 pag. 24 or refer to your Company procedures).



9. When the pressure test is over, remove the top cap and start the perforation of the pipe using the cutter installed in the tapping tee; the cutter is designed to keep the coupon inside.

10. PERFORATION PROCEDURE:

- Before starting the perforation, remove the label on the upper part of the collar; for a correct perforation, you have to make the number of turns reported on the label.
- Once the label is removed, insert the drilling tool completely: mark the level on the tool at the top of the collar; from this point, mark the tool (\*) upon the vertical at the distance reported on the label.

(\*) A T-KEY WITH A HEXAGONAL MALE END; OR A HEXAGONAL BAR (WITH RATCHET WRENCH).

- Turn clockwise the drilling tool for the number of turns from label: when the second mark of the tool is reached, the perforation is completed.

11. Turn counter-clockwise the drilling tool to back the cutter to the upper position.

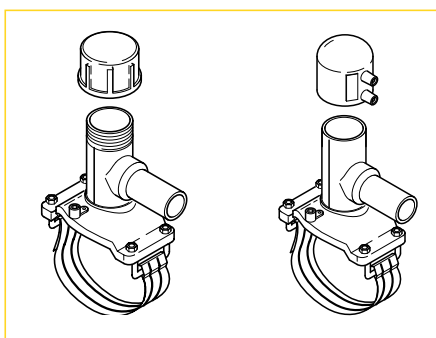
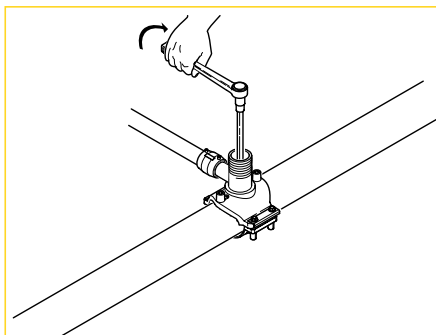


**KEEP THE BODY CLEAR OF THE FITTING DURING THIS OPERATION. DO NOT USE AUTOMATIC DRILLS. DO NOT REMOVE THE UPPER STOPPER.**

There are two versions:

- VERSION WITH THREADED CAP: Replace the top cap and tighten down to the stop (use the proper tool).
- VERSION WITH ELECTROFUSION CAP: weld an electrofusion end cap on the top of the collar (included in the packaging).

12. The underclamp may be removed or left permanently.



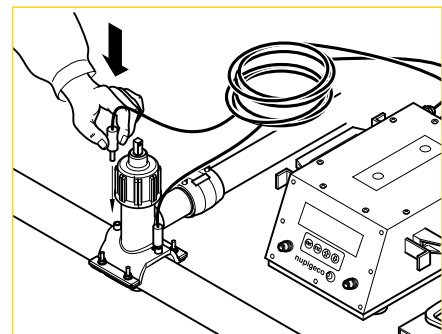
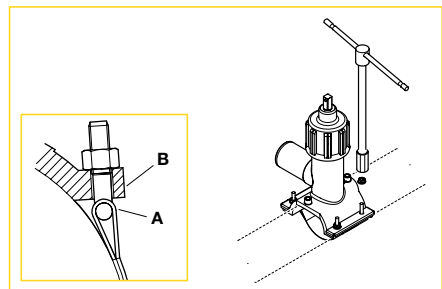
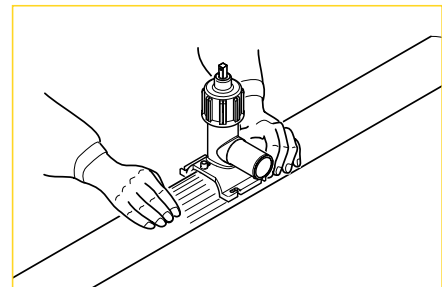
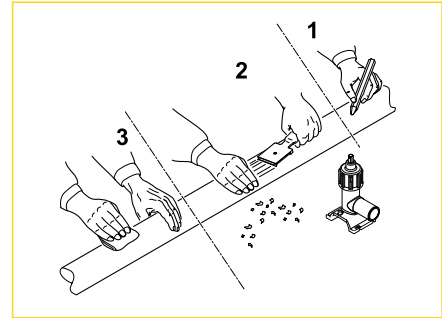
VERSION	MAXIMUM OPERATING PRESSURE
THREADED CAP	72.5 psi / 5 bar
ELECTROFUSION CAP	145 psi / 10 bar*

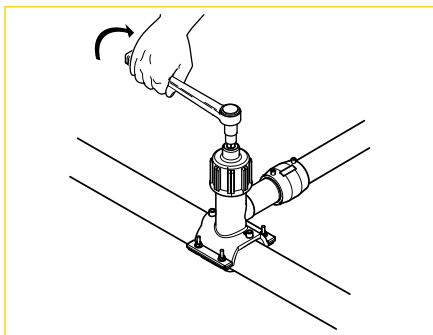
\*Only on PE80/PE100 (PE4710/PE3408) SDR11 pipes

<b>Fusion Range</b>	1¼" - 12" / Ø 40 ÷ 315 mm SDR11 - SDR17.6
<b>Working temperature</b>	(14 - 113)°F / (-10 ÷ +45)°C
<b>Max pipe ovalization according to:</b>	EN1555-2 / EN12201-2 ASTM D2513

# 12. TAPPING VALVES

1. Mark the welding area on the main pipe with a wax crayon or marker.
2. Scrape carefully the surface of the pipe and the spigot of the outlet with a hand scraper to remove the oxidized PE layer.
3. Clean the external surface of the pipe, the spigot of the outlet and the welding area of the saddle with isopropanol and a soft wiping cotton cloth without any printing.  
Wait until the clean parts are completely dry; mark the insertion depth on the spigot of the outlet.
4. Apply the tapping tee on to the pipe watching out not to contaminate the previously cleaned surfaces.
5. Fasten the tapping tee on the pipe using the integrated flexible belt: use a wrench to tighten the four screw nuts until the U-bolt **A** and the top part of tapping tee **B** come into tight contact.
6. Connect the service line with the spigot of the outlet, following the installation instructions for that specific fitting.
7. Connect the two cables of the electrofusion machine to the connectors of the tapping valve, scan the barcode with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2). After completing the welding process, verify that no material has leaked out of the joint between the pipe and the fitting and wait for the completion of the cooling time indicated on the barcode (see Table 5 pag. 24).
8. At the end of the cooling time, start the pressure test of the service line (See Chapter 5 and Table 6 pag. 24 or refer to your Company procedures).





- 9.** When the pressure test is over, start the perforation of the pipe using the cutter already installed in the tapping valve; the cutter is designed to keep the coupon inside. Use the appropriate tool (\*) to screw down manually the cutter (turn clockwise) to the lower stopper (DOWN POSITION), then move back (turn counter-clockwise) the cutter up to the upper stopper (UP POSITION).

(\*) T KEY OR RATCHET WRENCH WITH FEMALE SQUARE END, □14.7mm TYPE E – DIN 3223.

**KEEP THE BODY CLEAR OF THE FITTING DURING THIS OPERATION.**

**DO NOT USE AUTOMATIC DRILLS FOR PERFORATION OR ACTUATION OF THE VALVE.**



**DO NOT REMOVE THE THREADED CAP.**

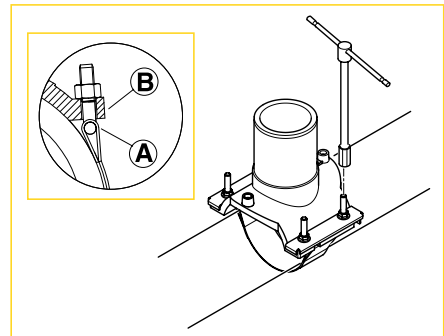
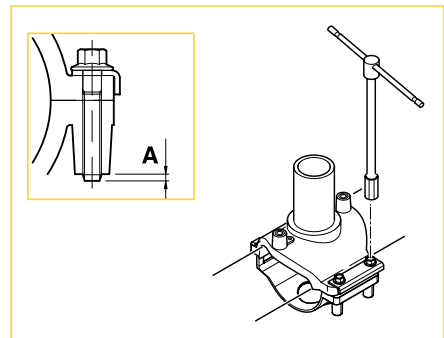
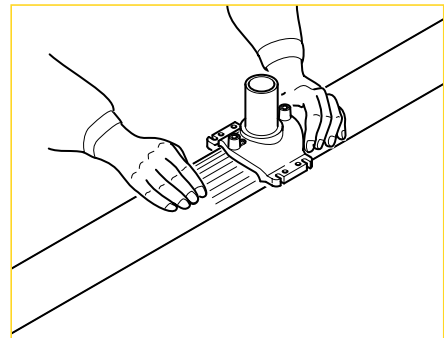
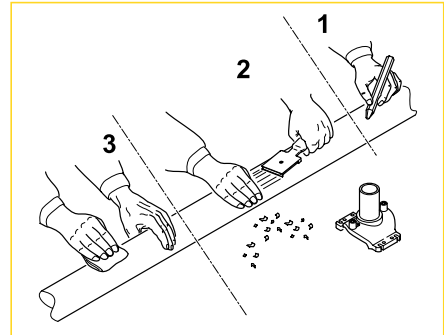
**DO NOT EXCEED 150 NM TORQUE ON THE STOPPERS IN UP AND DOWN POSITION.**

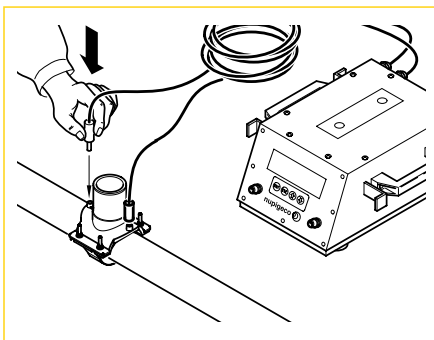
- 10.** The flexible belt may be removed or left permanently.
- 11.** Install the operating shaft (female square end, □14.7mm Type E – DIN 3223) for remote valve actuation.
- 12.** EPREV is ready to be used as a valve for the service line during normal duty:
- **DOWN POSITION: service line CLOSED (TURN CLOCKWISE).**
  - **UP POSITION: service line OPEN (TURN COUNTER-CLOCKWISE).**

# 13. BRANCH SADDLES

FOR INSTALLATION OF TOP LOAD BRANCH SADDLES ON PRESSURE PIPE, REFER TO CHAPTER 20 “DRILLING MACHINE FOR USE ON BRANCH SADDLES”

1. Mark the welding area on the main pipe with a wax crayon or marker.
2. Scrape carefully the surface of the pipe and the spigot of the outlet with a hand scraper to remove the oxidized PE layer.
3. Clean the external surface of the pipe and the welding area of the saddle with isopropanol and a soft wiping cotton cloth without any printing. Wait until the clean parts are completely dry.
4. Apply the branch saddle on to the pipe watching out not to contaminate the previously cleaned surfaces.
5. Fasten the branch saddle on the pipe using the integrated underclamp. Depending on models, there are two types of underclamp:
  - a. **Quick-coupling rigid underclamp:** hook the square holes of the underclamp to the teeth of the upper part; line up the metal spacer and use a wrench to tighten the two screws until they are in position **A** in the lower part (feel the screws sticking out the bottom).
  - b. **Flexible belt:** use a wrench to tighten the four screw nuts until the U-bolt **A** and the top part of tapping tee **B** come into tight contact.

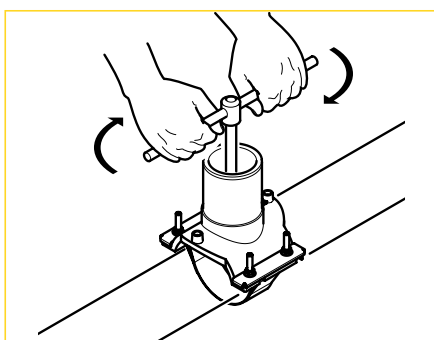




6. Connect the two cables of the electrofusion machine to the connectors of the branch saddle, scan the barcode with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2). After completing the welding process, verify that no material has leaked out of the joint between the pipe and the fitting and wait for the completion of the cooling time indicated on the barcode (see Table 13, pag.25).



**NEVER PERFORATE THE PIPE BEFORE COMPLETING THE WELDING PROCESS**



7. At the end of the cooling time, start the pressure test; (See Chapter 5 and Table 14 pag. 25 or refer to your Company procedures).
8. When the pressure test is over, start the perforation of the pipe.
9. The underclamp may be removed or left permanently.
10. Connect the service line to the spigot of the outlet, following the installation instructions for that specific fitting.



**VERIFY THAT THE DIAMETER OF THE CUTTER IS COMPATIBLE WITH THE INSIDE DIAMETER OF THE SPIGOT.**

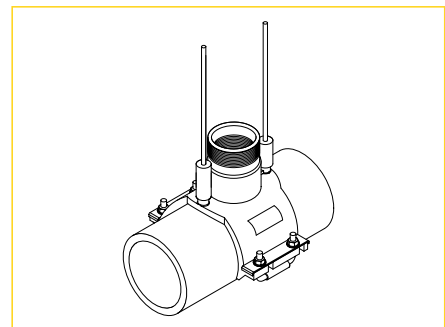
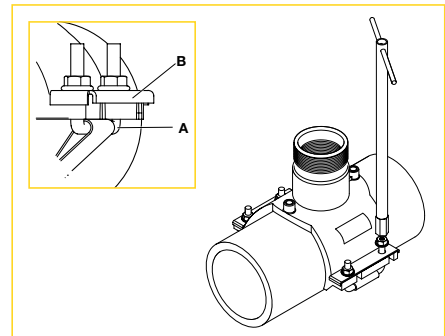
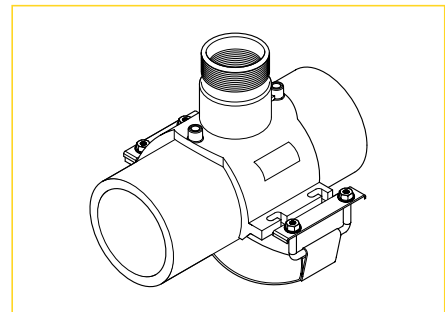
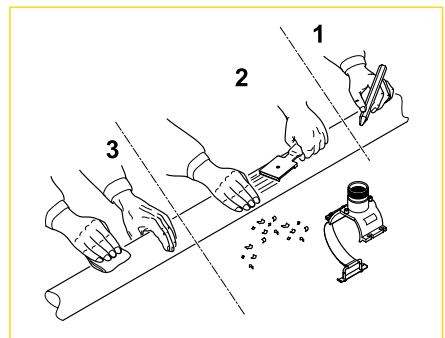
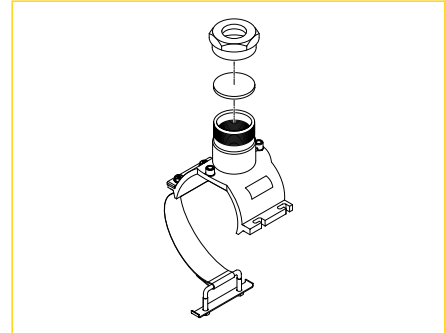
**AVOID ANY DAMAGE TO THE SPIGOT DURING THE PERFORATION**

# 14. BAGGING SADDLES



14

1. Mark the welding area on the main pipe with a wax crayon or marker.
2. Scrape carefully the surface of the pipe with a hand scraper to remove the oxidized PE layer.
3. Remove the internal and external protection caps from the fitting just before the installation.
4. Clean the external surface of the pipe and the welding area of the saddle with isopropanol and a soft wiping cotton cloth without any printing. Wait until the clean parts are completely dry.
5. Apply the bagging saddle on to the pipe watching out not to contaminate the previously cleaned surfaces.
6. Fasten the bagging saddle on the pipe using the integrated Flexible belt: use a wrench to tighten the four screw nuts until the U-bolt A and the top part of tapping tee B come into tight contact.
7. Connect the two cables of the electrofusion machine to the connectors of the bagging saddle, scan the barcode with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2). After completing the welding process, verify that no material has leaked out of the joint between the pipe and the fitting and wait for the completion of the cooling time indicated on the barcode (see Table 13, pag. 25).
8. At the end of the cooling time, start the pressure test (See Chapter 5 and Table 14 pag. 25 or refer to your Company procedures).
9. When the pressure test is over, it's possible to connect the balloon kit and proceed with the pipe shut-off; refer to the instructions of the balloon manufacturer.





14



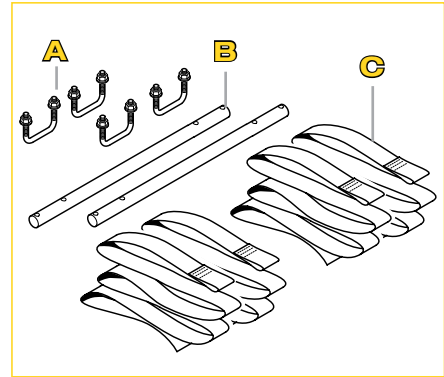
# 15. HIGH VOLUME BRANCH SADDLES FOR INSTALLATION WITH BELTS

FOR INSTALLATION OF TOP LOAD BRANCH SADDLES ON PRESSURE PIPE, REFER TO CHAPTER 20 "DRILLING MACHINE FOR USE ON BRANCH SADDLES"

High Volume Branch Saddles  $\varnothing \geq 8'' \times 6''$  - 200/160 mm are supplied with the necessary equipment for a complete installation.

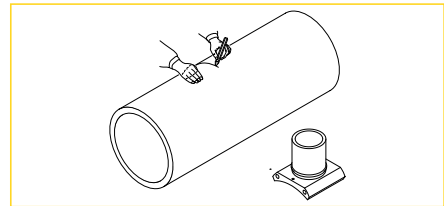
**THE KIT INCLUDES:**

- A.** nr. 4 threaded fork pivots with nuts
- B.** nr. 2 metal bars
- C.** A pair of adjustable belts

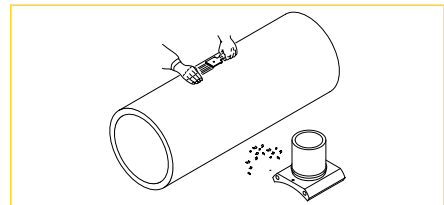


15

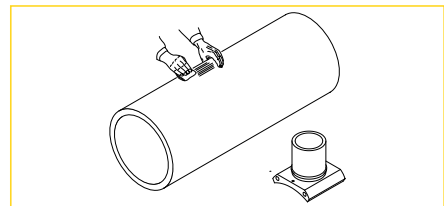
**1.** Mark the welding area on the main pipe with a wax crayon or marker.



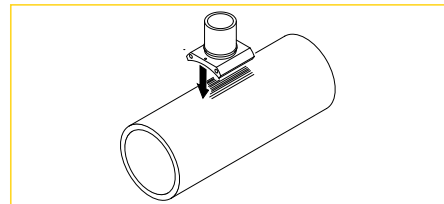
**2.** Scrape carefully the surface of the pipe with a hand scraper to remove the oxidized PE layer.



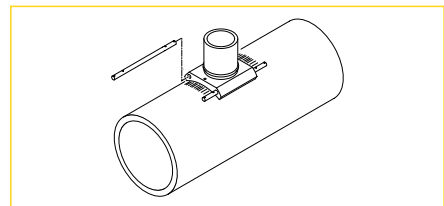
**3.** Clean the external surface of the pipe and the welding area of the saddle with isopropanol and a soft wiping cotton cloth without any printing. Wait until the clean parts are completely dry.

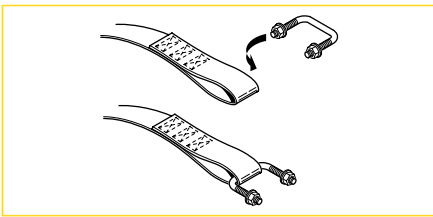


**4.** Immediately after scraping and cleaning the areas to be welded, install the branch onto the pipe. Be careful not to contaminate the previously cleaned surfaces.

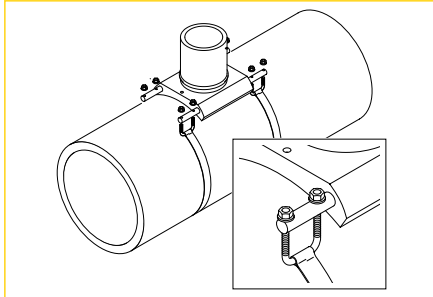


**5.** Insert the two metal bars supplied in the package in to the side holes

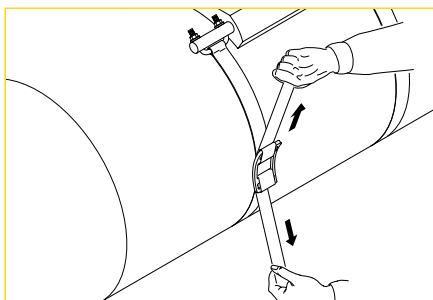




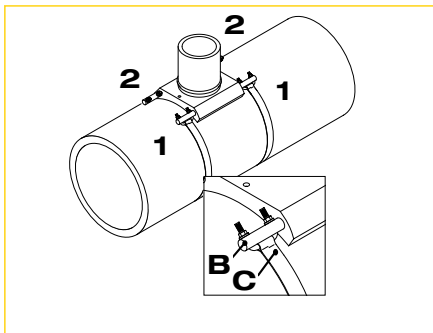
6. Insert the four fork pivots into the four slots at the belt ends.



7. Insert a pair of fork pivots into the two parallel ends of the metal bars. Join the four nuts and keep them at the end of the threads (don't tighten them). Repeat this operation using the second pair of fork pivots.

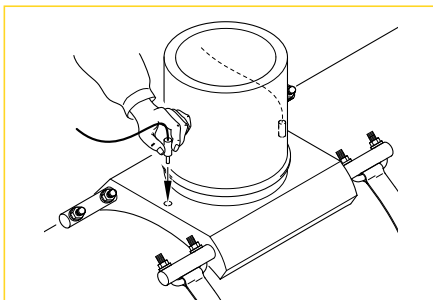


8. Pull the free belts outwards (across the pipe axis) until the band perfectly fits to the pipe.



9. Tighten the nuts completely using a wrench until the metal bar (B) and the belt (C) are touching. Check that the belts are properly tight. Important: tighten the nuts of the first bar (1) and then those of the second bar (2). The saddles must fit the pipe.

10. Connect the two cables of the electrofusion machine to the connectors of the branch saddle, scan the barcode with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2). After completing the welding process, verify that no material has leaked out of the joint between the pipe and the fitting and wait for the completion of the cooling time indicated on the barcode (see Table 15, pag.25).



11. Start the pressure test (See Chapter 5 and Table 16 pag. 25 or refer to your Company procedures).

12. When the pressure test is over, start the perforation of the pipe with Elofit Drilling Machine (check cod. 00FP in Nupi Equipment List) or other equivalent.



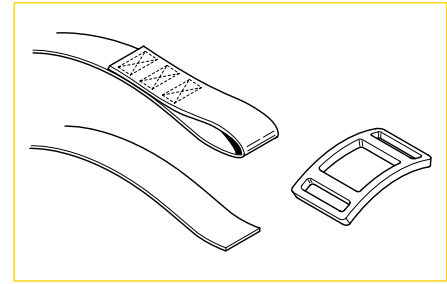
**VERIFY THAT THE DIAMETER OF THE CUTTER IS COMPATIBLE WITH THE INSIDE DIAMETER OF THE SPIGOT. AVOID ANY DAMAGE OF THE SPIGOT DURING THE PERFORATION.**

13. Connect the service line to the spigot of the outlet, following the installation instructions for that specific fitting.

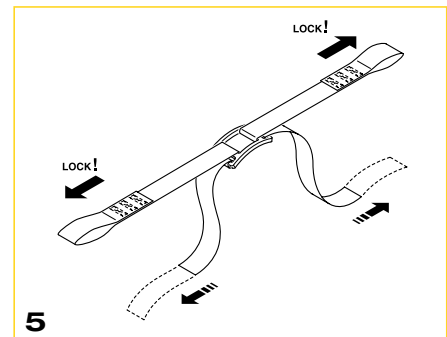
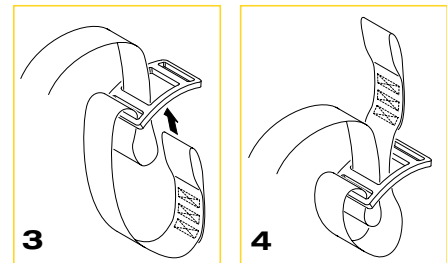
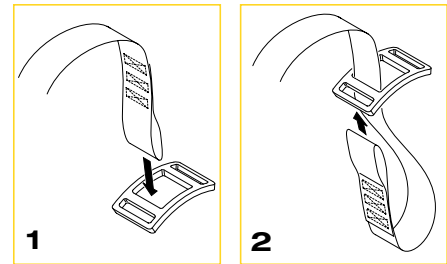


**NEVER PERFORATE THE PIPE BEFORE COMPLETING THE WELDING PROCESS**

## ASSEMBLY OF THE FIXING BELT



1. One end of the belt is smooth whereas the other end has triple stitching forming a ring. The metal buckle has a slight bend, a big central hole and two smaller lateral holes.
2. Insert the part of the belt with the ring inside the central hole from top to bottom (1) and then from bottom to top by inserting it in the smaller lateral hole (2) and then again from bottom to top inside the big central hole (3).
3. Repeat the operation with the second band and then again with the second pair of belts.
4. Check if the two belts have been inserted correctly by pulling the ends with the rings towards the outside. If the operation has been carried out properly, the bands will not slip and the two smooth ends will be free to move to allow their length to be adjusted.
5. If the belts have not been inserted correctly inside the buckle, during the assembly the belts will not be tight enough to complete the welding process correctly.





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# 16. POSITIONING TOOL FOR 'TOP LOAD' BRANCH SADDLES, TAPPING TEES AND TAPPING VALVES.

**TECHNICAL CHARACTERISTICS:**

Material: steel and aluminium  
 Dimensions: 1.57x1.18x0.96 inch  
 Weight: 15 lb

**RANGE OF APPLICATION:**

- 12EICOLTL142402** - branch saddles 2"IPS for mains from 14"IPS to 24"IPS.
- 12EIPRESTL142402** - tapping tees with outlet 2"IPS for mains from 14"IPS to 24"IPS

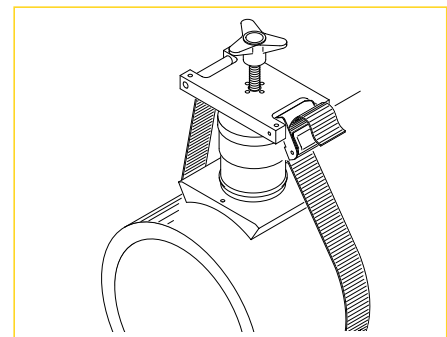
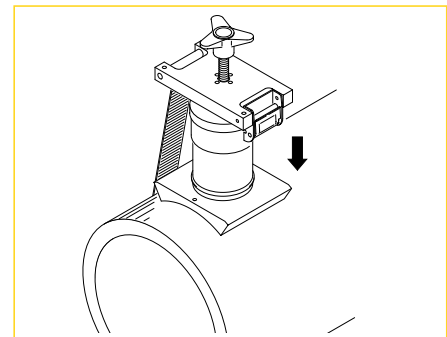
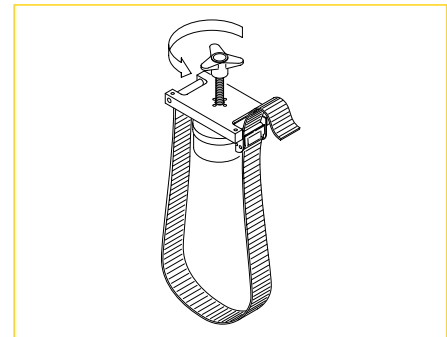
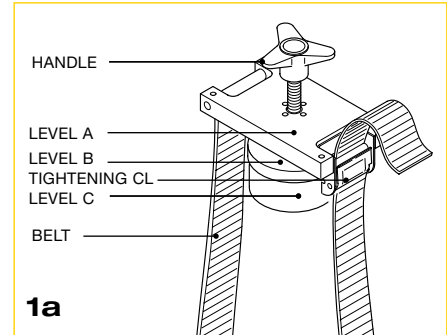
**NOTE:** Top load branching saddles can be welded on pipes with ovalitation max. 1%.

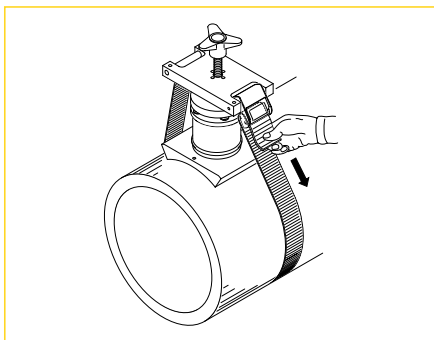
**COMPONENTS**

See fig. 1a

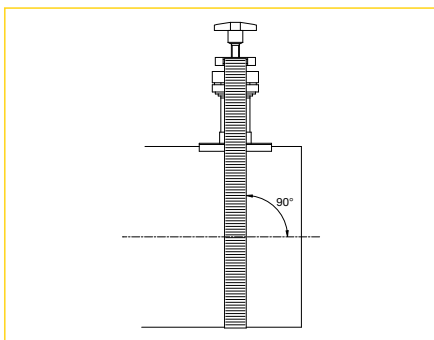
**INSTALLATION**

- 1.** Prepare the tool for use by turning counterclockwise the handle until level **A** will reach level **B**.
- 2.** Insert the positioning tool into the "top load" saddle and place them on the pipe, after completing scraping and cleaning operations (check installation instruction of the fitting)
- 3.** Pass the belt under the pipe and insert it into the tightening clamp from the bottom to the top, as showed on the figure. Care not to move the fitting in order not to compromise the cleaning operation.

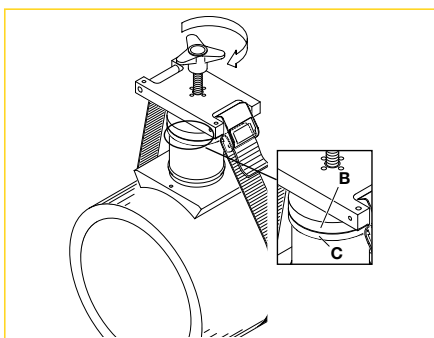




4. Insert the belt up in the buttonhole and then pull down to tighten the 'top load' saddle on the pipe.



5. Make sure that the belt is perpendicular to pipe axis.



6. Turn the handle clockwise until level **B** and level **C** touch together.



**ATTENTION CHECK THAT THE GAP BETWEEN THE SADDLE AND THE PIPE IS LOWER THAN 0.039" (1mm) ONLY IN THIS CASE PROCEED WITH THE WELDING ON THE PIPE. WAIT FOR THE COOLING TIME INDICATED ON THE BARCODE ON THE FITTING.**

7. Remove the positioner by turning counterclockwise the handle and extract the belt from the tightening clamp.



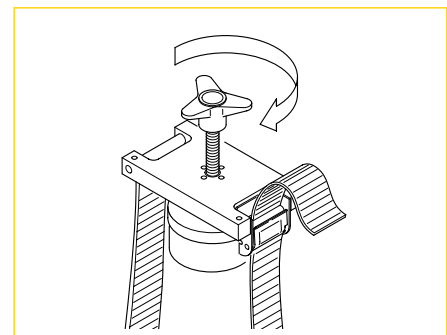
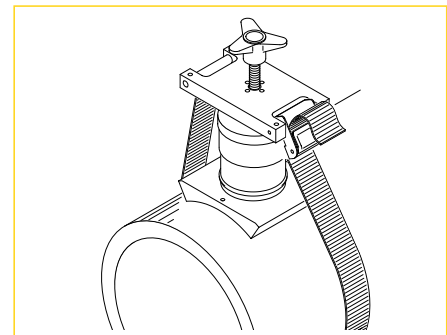
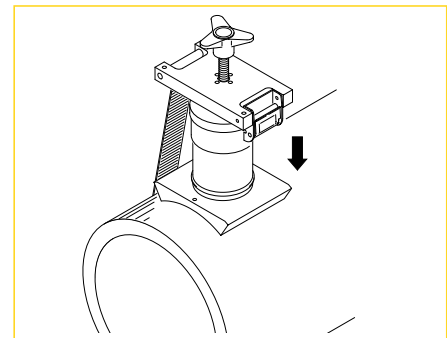
# 17. 'TOP LOAD' BRANCH SADDLES

(CODE 12EICOLTL142402 - 12ECOLTL356363)

FOR INSTALLATION OF TOP LOAD BRANCH SADDLES ON PRESSURE PIPE, REFER TO CHAPTER 20 "DRILLING MACHINE FOR USE ON BRANCH SADDLES"

Top Load Branch Saddles  $\varnothing 14''-24'' \times 2''$  ( $\varnothing 355 \div 630 / 63$  mm) require Elofit Positioning Tool for the installation (page 47).

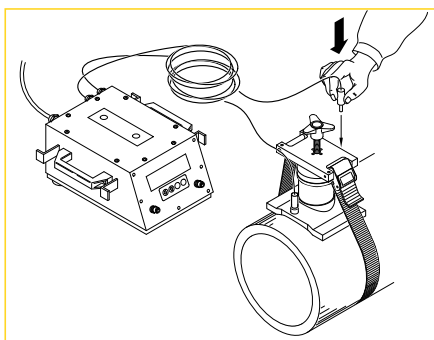
1. Mark the welding area on the main pipe with a wax crayon or marker.
2. Scrape carefully the surface of the pipe to remove the oxidized PE layer.
3. Clean the external surface of the pipe and the welding area of the saddle with isopropanol and a soft wiping cotton cloth without any printing. Wait until the clean parts are completely dry.
4. Apply the branch saddle on to the pipe watching out not to contaminate the previously cleaned surfaces.
5. Fasten the branch saddle on the pipe using the positioning tool for Top Load branch saddles (Refer to Chapter 16).



**USE ONLY THE POSITIONING TOOL SUPPLIED BY NUPI.**



**CHECK IF THE GAP BETWEEN THE SADDLE AND THE PIPE IS SMALLER THAN 0,039" (1 mm) : ONLY IN THIS CASE PROCEED WITH THE WELDING ON THE PIPE, OTHERWISE CONTACT YOUR SALES REPRESENTATIVE OR THE MANUFACTURER FOR FULL SUPPORT.**



6. Connect the two cables of the electrofusion machine to the connectors of the branch saddle, scan the barcode with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2).
7. After completing the welding process, verify that no material has leaked out of the joint between the pipe and the fitting and wait for the completion of the cooling time indicated on the barcode (see Table 17, pag. 26).
8. After the cooling time, it's possible to remove the positioning tool.
9. Start the pressure test (See Chapter 5 and Table 18 pag. 26 or refer to your Company procedures).
10. When the pressure test is over, start the perforation of the pipe with Elofit Drilling Machine (check cod. 00FP in Nupi Equipment List) or other equivalent.



**VERIFY THAT THE DIAMETER OF THE CUTTER IS COMPATIBLE WITH THE INSIDE DIAMETER OF THE SPIGOT.**

**AVOID ANY DAMAGE OF THE SPIGOT DURING THE PERFORATION.**

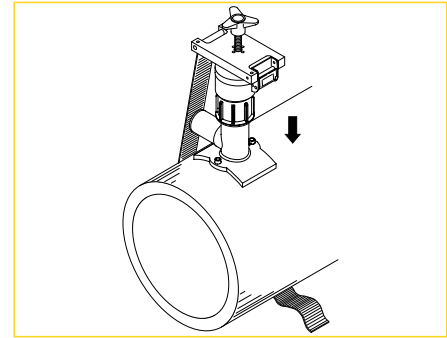
11. Connect the service line to the spigot of the outlet, following the installation instructions for that specific fitting.

# 18. 'TOP LOAD' TAPPING TEES

(CODE 12EIPRESTL142402 - 12EPRESTL356363)

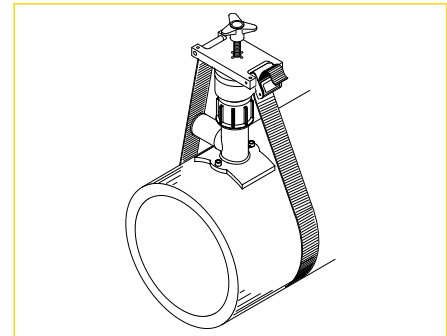
Top Load Tapping Tees  $\varnothing 14''-24'' \times 2''$  ( $\varnothing 355 \div 630/63$  mm) require Elofit Positioning Tool (00POS01) for the installation (page 47).

1. Mark the welding area on the main pipe with a wax crayon or marker.
2. Scrape carefully the surface of the pipe to remove the oxidized PE layer.
3. Clean the external surface of the pipe and the welding area of the saddle with isopropanol and a soft wiping cotton cloth without any printing. Wait until the clean parts are completely dry.
4. Apply the tapping tee on to the pipe watching out not to contaminate the previously cleaned surface.



**MAKE SURE THAT THE CAP IS COMPLETELY TIGHTENED.**

5. Fasten the tapping tee on the pipe using the positioning tool for Top Load branch saddles (Refer to Chapter 16).

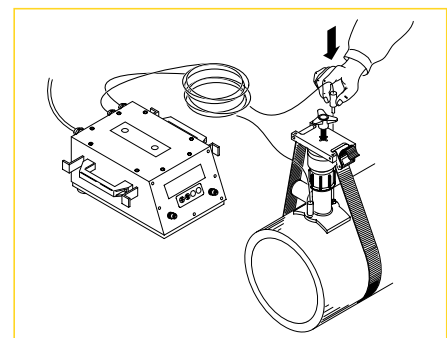
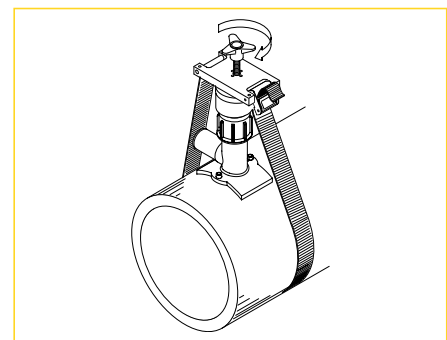


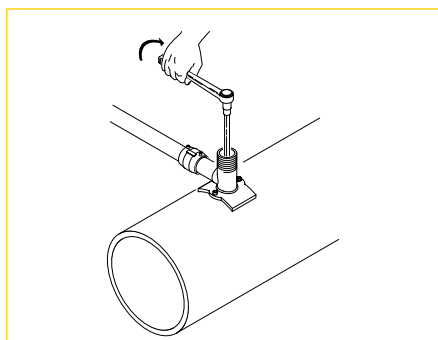
**USE ONLY THE POSITIONING TOOL SUPPLIED BY NUPI.**



**CHECK IF THE GAP BETWEEN THE SADDLE AND THE PIPE IS SMALLER THAN 0,039" (1 mm) : ONLY IN THIS CASE PROCEED WITH THE WELDING ON THE PIPE, OTHERWISE CONTACT YOUR SALES REPRESENTATIVE OR THE MANUFACTURER FOR FULL SUPPORT.**

6. Connect the two cables of the electrofusion machine to the connectors of the tapping tee, scan the barcode with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2). After completing the welding process, verify that no material has leaked out of the joint between the pipe and the fitting and wait for the completion of the cooling time indicated on the barcode (see Table 9, pag 24). After the cooling time, remove the positioning tool.





7. Connect the service line with the spigot of the outlet, following the installation instructions for that specific fitting.
8. Start the pressure test (See Chapter 5 and Table 10 pag. 24 or refer to your Company procedures).
9. When the pressure test is over, remove the top cap and start the perforation of the pipe using the cutter installed in the tapping tee; the cutter is designed to keep the coupon inside. Use an appropriate tool to screw down manually the cutter (turn clockwise) until the pipe has been drilled through, then move back the cutter to the upper position (turn counter-clockwise).
10. After the perforation is complete, replace the top cap and tighten down to the stopper (use the proper tool).

**12EIPRESTL142402 must be installed on pipes with the following SDR:**

DN Pipe IPS	Max wall thickness (SDR)
14"	11
16"	11
18"	17
20"	17
22"	21
24"	21

**Don't install 12EIPRESTL142402 on pipes with thickness greater than 1,55".**



# 19. 'TOP LOAD' TAPPING VALVES

**(CODE 12EIPREVTL142402 - 12EPREVTL356363)**

Top Load Tapping Valves  $\varnothing 14''$ - $24'' \times 2''$  ( $\varnothing 355 \div 630/63$  mm) require Elofit Positioning Tool (00POS01) for the installation (page 47).

1. Mark the welding area on the main pipe with a wax crayon or marker.
2. Scrape carefully the surface of the pipe and the spigot of the outlet to remove the oxidized PE layer.
3. Clean the external surface of the pipe and the welding area of the saddle with isopropanol and a soft wiping cotton cloth without any printing. Wait until the clean parts are completely dry.
4. Apply the tapping valve on to the pipe watching out not to contaminate the previously cleaned surfaces. Use the appropriate tool to check that the top cap is tightened.
5. Fasten the tapping valve on the pipe using the positioning tool for Top Load branch saddles (Refer to Chapter 16).

**USE ONLY THE POSITIONING TOOL SUPPLIED BY NUPI.**



**CHECK IF THE GAP BETWEEN THE SADDLE AND THE PIPE IS SMALLER THAN 0,039'' (1 mm): ONLY IN THIS CASE PROCEED WITH THE WELDING ON THE PIPE, OTHERWISE CONTACT YOUR SALES REPRESENTATIVE OR THE MANUFACTURER FOR FULL SUPPORT.**

6. Connect the two cables of the electrofusion machine to the connectors of the tapping valve, scan the barcode with the barcode scanner or enter the welding parameters manually. (Refer to Chapter 2)
7. Connect the service line with the spigot of the outlet, following the installation instructions for that specific fitting.
8. After completing the welding process, verify that no material has leaked out of the joint between the pipe and the fitting and wait for the completion of the cooling time (See Table 11, pag 25)
9. After the cooling time, remove the positioning tool.



10. Start the pressure test (See Chapter 5 and Table 12 pag. 25 or refer to your Company procedures).
11. When the pressure test is over, start the perforation of the pipe using the cutter already installed in the tapping valve; the cutter is designed to keep the coupon inside. Use the appropriate tool (\*) to screw down manually the cutter (turn clockwise) to the lower stopper (DOWN POSITION), then move back (turn counter-clockwise) the cutter up to the upper stopper (UP POSITION).

(\*) T key or ratchet wrench with female square end, □14.7 mm Type E – DIN 3223.

**KEEP CLEAR OF THE FITTING DURING THIS OPERATION.**

**DO NOT USE AUTOMATIC DRILLS FOR PERFORATION OR ACTUATION OF THE VALVE.**



**DO NOT REMOVE THE THREADED CAP.**

**DO NOT EXCEED 150 NM TORQUE ON THE STOPPERS IN UP AND DOWN POSITION.**

12. Install the operating shaft (female square end, □14.7 mm Type E – DIN 3223) for remote valve actuation.
13. EPREV is ready to be used as a valve for the service line during normal duty:
  - **DOWN POSITION: service line CLOSED (TURN CLOCKWISE).**
  - **UP POSITION: service line OPEN (TURN COUNTER-CLOCKWISE).**

PIPE RANGE OF INTALLATION	
ø 14'-18' (355÷450 mm)	SDR 33, 26, 21, 17.6, 17
ø 20'-24' (500÷630 mm)	SDR 33, 26, 21



# 20. DRILLING MACHINE FOR USE ON BRANCH SADDLES

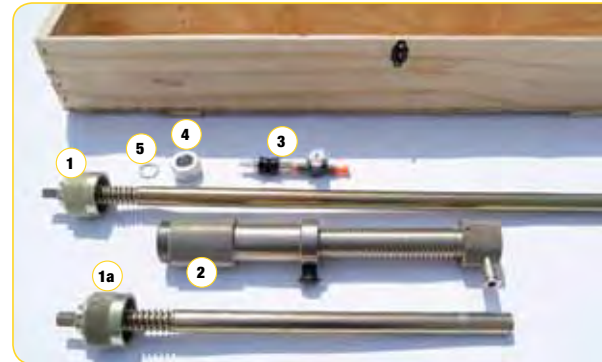
DRILLING EQUIPMENT (code 00FP) FOR USE ON BRANCH SADDLES FUSED ON POLYETHYLENE PIPELINES FOR PRESSURE AND NON-PRESSURE USE Ø 90 ÷ 1000 mm (3" - 40")

## 1. MOUNTING KIT

The package includes:

1. Long shaft for drilling under pressure and non-pressured lines.
- 1a. Short shaft for non-pressured drilling.
2. Body with threaded shaft, vent valve and safety lock.
3. Pressure gauge with valve for measuring and depressurizing.
4. Ring nut for holding the cutter.
5. Seeger ring.

The sets of adapters and cutters for each pipe size are available individually or in a complete kit with the drilling machine.



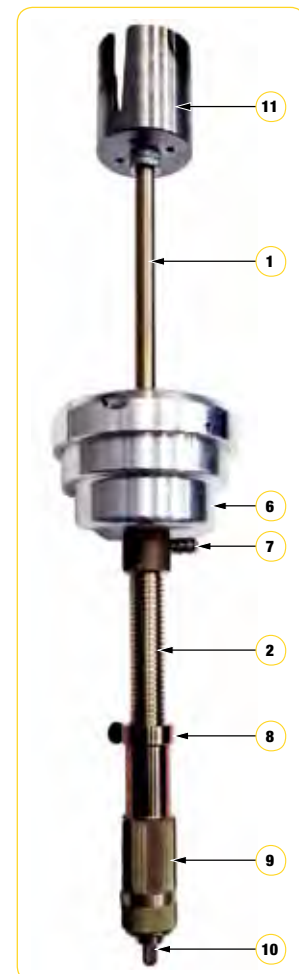
Adapter - Code 00FAxxx  
Ø 63 ÷ 160 mm (2" - 6")



Cutter - Code 00FFxxx  
Ø 63 ÷ 160 mm (2" - 6")

## 2. DRILLING MACHINE ASSEMBLY

1. SHAFT
2. BODY
6. ADAPTER
7. VENT VALVE
8. SAFETY LOCK
9. LOAD CELL FOR AXIAL LOADING
10. SQUARE END FOR CUTTER ROTATION
11. CUTTER



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### 3. DRILLING MACHINE SET-UP

The drilling machine must be assembled in an area clear of dirt, soil, sharp objects.

Keep particular care for cleanliness and integrity of the shaft and the threaded part of the body.

**THE SHORT SHAFT IS ONLY TO BE USED FOR THE DRILLING OF NON-PRESSURIZED PIPELINES.**



#### PHASES OF ASSEMBLY

1. Ensure that the seeger ring (5) is removed from the end of the shaft.
2. Insert the shaft (1) in the body of the drilling machine (2) and screw-in tightly the upper ring nut (9).  
*NOTE: If the shaft is already fitted into the body, skip directly to point 3.*
3. Put the adapter (6) - code 00FAxxx - on the shaft and screw it in until it bottoms out (12). Make sure the adapter is clean before use.
4. Slide the ring nut for holding the cutter (4) on the shaft.
5. Set the seeger ring (5) in the groove on the end of the shaft.
6. Insert the hexagonal key (13) of the cutter (11) - code 00FFxx - into the corresponding seat in the end of the shaft (1).
7. Screw, by hand, the ring nut for holding (4) the cutter and tighten.  
*Don't use a wrench.*
8. The drilling machine is now ready for use.



### 4. INSTALLATION OF THE SYSTEM FOR DRILLING

#### 4.1 DRILLING UNDER PRESSURE

1. Install the appropriate branch saddle (14) - code ECOLxxx or ECOLTLxxx - on the main pipe. Follow the instructions of the product and wait for the completion of the cooling time before attaching the tool.
2. Weld a PE ball valve (15), of the appropriate diameter, on the outlet of the branch saddle, with an electrofusion coupler.

We recommend that you install a branch saddle with the PE ball valve pre-installed, if available (as in the picture). Before performing the welding, check that the distance from the end of the spigot (16) of the ball valve and the upper surface (17) of the main pipeline is:



610 to 635 mm (24" to 25") for main pipeline  $\varnothing > 160$  mm (6")

640 to 650 mm (25" to 26") for main pipeline  $\varnothing \leq 160$  mm (6")

**NOTE:** Adapt the system by shortening the spigots of the saddle and the valve, or by welding a piece of pipe of the needed length (with an electrofusion coupler) on the end of the spigot of the valve.

Follow the instructions of the product and wait for the completion of the cooling time.

3. OPEN the ball valve and start pressure test of the branch (follow specific product instructions and your Company procedures).
4. Chamfer the end of the spigot/pipe (16), in order not to damage the O-ring of the adapter.
5. Check that ball valve is in OPEN position. (15).
6. Insert the drilling machine into the outlet and place the adapter (6) on the end of the spigot/pipe (16). Make sure the outlet is chamfered and any dirt is removed.
7. Mark the depth of insertion on the spigot/pipe to verify that the adapter is fully inserted.
8. Take care not to damage the inner surface of the valve with the cutter during insertion.



9. Install and tighten the clamping system of the adapter (6). The jaws must be as close as possible and the positioning pins of the adapter must be inserted into the opposite seats of the jaws. Do not over tighten the jaws.

## 4.2 DRILLING NON PRESSURIZED PIPE

1. Install the appropriate branch saddle - code ECOLxxx or ECOLTLxxx - on the main pipe: follow the instructions of the product; wait for the completion of the cooling time before attaching the tool.
2. Weld a piece of pipe on the spigot of the branch saddle, by an electrofusion coupler, so that the distance from the top of the branch pipe and the upper surface of the main pipeline is:



610÷635 mm (24"÷25"), for main pipeline  $\varnothing > 160$  mm (6")

640÷650 mm (25"÷26") , for main pipeline  $\varnothing \leq 160$  mm (6")

Follow the instructions of the product and wait for the completion of the cooling time.

**NOTE:** When using the drilling machine with the short shaft: insert the drilling machine and fit the adapter directly on the spigot of the branch saddle. Chamfer and clean the top side of the spigot and mark the depth of insertion on it making sure that you have inserted the adapter until it reaches a complete stop.

Install and tighten the clamping system of the adapter. The jaws must be as close as possible and the positioning pins of the adapter must be inserted into the opposite seats of the jaws. Do not over tighten the jaws.

**3.** Start pressure test of the branch (follow specific product instructions and your Company procedures).

**4.** Chamfer the end of the pipe, in order not to damage the o-ring of the adapter.

**5.** Insert the drilling machine and attach the adapter to the end of the pipe, chamfered and clear of dirt.

Mark the depth of insertion on the pipe to verify that the adapter is fully inserted.

Take care not to damage the inner surface of the valve with the cutter during insertion.

Install and tighten the clamp system of the adapter: the jaws must be as close as possible and the positioning pins of the adapter must be inserted into the opposite seats of the jaws.

20



**5.**

**DRILLING**

**1.**

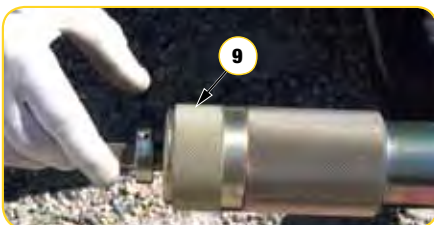
Remove the safety lock of the upper limit by pulling the plunge (8) and at the same time turning clockwise the load cell (9) for axial loading.

**2.**

Drive-down the cutter by turning clockwise (screw) the load cell (9) with one hand, until the torque rises (the cutter comes in contact with the pipe) and there is a gap between the load cell and the bush for cutter rotation.

**3.**

With the other hand, insert the ratchet wrench on the hexagonal key (18) of the bush and turn clockwise (screw), until the torque decreases and the gap is closed.



**NOTE:** Do not turn the cutter counter-clockwise (unscrew) with the ratchet wrench.

**4.** Repeat point 2 and then point 3: the mutual action of descent of the cutter (screw the load cell) and rotation of the cutter by the ratchet wrench, allows the operator to regulate the suitable stress for cutting with the lowest amount of time and energy.



**5.** Repeat points 2 and 3 until the pipe is completely perforate (the torque decreases and there is no longer any axial load).



**NOTE:** For main pipeline  $\varnothing > 160 \text{ mm (6")}$  it's recommended to complete the operation to the lower stopper (lock screw of the load cell).

**6.** Back the cutter into the up position by turning counter-clockwise (unscrew) the load cell (9), to the upper stopper (8) (you hear the 'click' of the plunger of the safety lock).



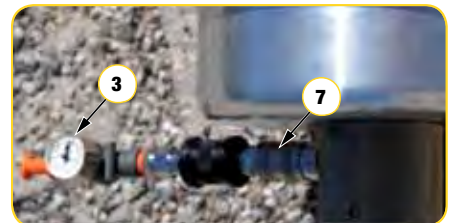
If excessive effort is required for unscrewing the load cell in the lower position, rotate the cutter clockwise by the ratchet wrench.

**Do not completely back out the cutter counter-clockwise (unscrew) with the ratchet wrench.**



**7.** Insert the pressure gauge (3) in the vent valve (7) and check the pressure in the chamber.

**IF YOU ARE DRILLING NON PRESSURIZED PIPE, SKIP DIRECTLY TO POINT 10.**



**8.** Unscrew the upper load cell of the body (19) and back out the shaft (1) to the upper limit.

Keep clear of the back end of the drilling machine.





9. CLOSE the ball valve and discharge the pressure in the chamber through the purge valve (20).



10. Remove the clamping system of the adapter (6) and extract the drilling machine.

The cutter will hold inside the cut piece of pipe and the shavings (21).



11. Complete the installation of the branch in accordance with normal company procedures.

## 6. STORING OF THE DRILLING MACHINE

1. Re-insert the shaft and screw-in tightly the upper load cell.
2. Check that the safety lock of the upper limit is inserted (otherwise, turn the load cell until you hear the 'click' of the plunger).
3. Clean the shaft and the threaded body from dirt and soil, then lubricate.
4. Remove the coupon of the pipe and all the shavings from the cutter.

**NOTE:** Store the drilling machine in an area clear from dirt, soil, sharp objects; take particular care for cleanness and integrity of the shaft and the threaded part of the body.



# 21. SAFETY FITTINGS (EXCESS FLOW VALVES)

## BEFORE THE INSTALLATION

Check which type of ESF is suitable for the operating performances planned for the pipeline: read the Code and the Pressure Range on the label applied on the fitting, then refer to ESF Technical Catalogue.

Use Table 1 below for quick reference.

ESF SERIES	PRESSURE RANGE	DIAMETER	NOMINAL FLOW (at min pressure)
RED	35 mbar ÷ 5 bar	32 mm (DN25)	17 m <sup>3</sup> /h GAS (d=0.6; 15°C;1013 mbar)
		40 mm (DN32)	26 m <sup>3</sup> /h GAS (d=0.6; 15°C;1013 mbar)
		50 mm (DN40)	40 m <sup>3</sup> /h GAS (d=0.6; 15°C;1013 mbar)
		63 mm (DN50)	68.5 m <sup>3</sup> /h GAS (d=0.6; 15°C;1013 mbar)
WHITE	100 mbar ÷ 5 bar	32 mm (DN25)	27.5 m <sup>3</sup> /h GAS (d=0.6; 15°C;1013 mbar)
		40 mm (DN32)	39.5 m <sup>3</sup> /h GAS (d=0.6; 15°C;1013 mbar)
		50 mm (DN40)	58 m <sup>3</sup> /h GAS (d=0.6; 15°C;1013 mbar)
		63 mm (DN50)	93.5 m <sup>3</sup> /h GAS (d=0.6; 15°C;1013 mbar)
YELLOW	1 bar ÷ 5 bar	20 mm (DN15)	25 m <sup>3</sup> /h GAS (d=0.6; 0°C;1013 mbar)
		32 mm (DN25)	100 m <sup>3</sup> /h GAS (d=0.6; 0°C;1013 mbar)

# 1. INSTALLATION

ESF is provided already inserted into the proper fitting.

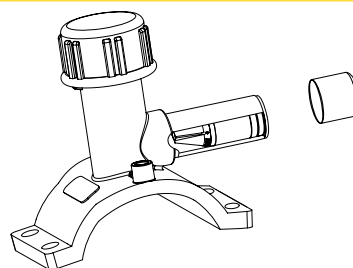
RED SERIES	WHITE SERIES	YELLOW SERIES
EPRESR	EPRESB	EPRESG
ESFAR	ESFAB	ESFAG
EMEY	EMEYB	EMEYG



**VERIFY THAT THE ARROW ON THE LABEL/FITTING MATCHES THE DIRECTION OF GAS FLOW**

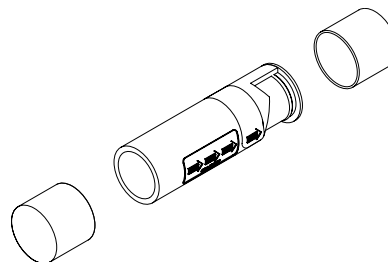
## EPRESR - EPRESB - EPRESG

ESF is inserted into the outlet of the Tapping-tee.



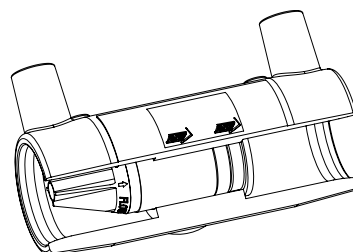
## ESFAR - ESFAB - ESFAG

ESF is fitted into the pipe adapter.



## EMEY - EMEYB - EMEYG

ESF is inserted into the electrofusion coupler.

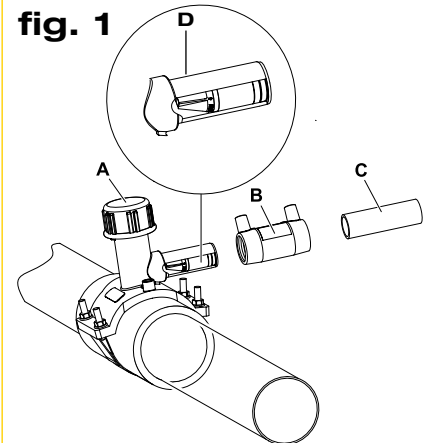


## INSTRUCTION FOR THE INSTALLATION OF EPRESR - EPRESB - EPRESG

1. Install the Tapping-tee [A] on the main pipeline (follow product instruction).
2. Connect the service line to the outlet of the Tapping-tee [A] (Fig.1)

### CHECK FLOW DIRECTION ON THE LABEL

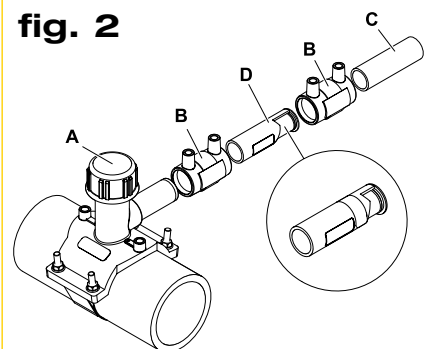
- Scrape and clean with PE solvent the edge of the pipe [C] and the outlet of the tapping tee [D] (take care not to damage ESF).
  - Insert them into EME electrofusion coupler [B] and proceed with welding ( follow product instruction ).
3. Wait for the cooling time indicated on the labels then proceed to **STARTING OPERATION (Point 2)**.



**fig. 1**  
**[A]** Tapping-tee saddle  
**[B]** Electrofusion coupler  
**[C]** PE service line  
**[D]** Tapping-tee outlet

## INSTRUCTION FOR THE INSTALLATION OF ESFAR - ESFAB - ESFAG

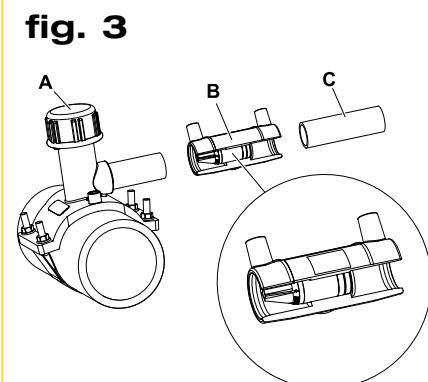
1. Connect the pipe adapter [D] to the service line (Fig.2)  
**CHECK FLOW DIRECTION ON THE LABEL**
  - Scrape and clean both the ends of the Pipe Adapter [D] (take care not to damage ESF).
  - Insert them into EME electrofusion couplers [B] and proceed with welding (follow product instruction).
2. Wait for the cooling time indicated on the label then proceed to **STARTING OPERATION (Point 2)**



**fig. 2**  
**[A]** Tapping-tee saddle  
**[B]** Electrofusion couplers  
**[C]** PE service line  
**[D]** Pipe Adapter with ESF inside

## INSTRUCTION FOR THE INSTALLATION OF EMEY - EMEYB - EMEYG

1. Connect the Electrofusion Coupler [B] to the service line (Fig.3) (follow product instruction).
  - Scrape and clean with PE solvent the edge of the pipe [C] and the outlet of the tapping tee [A] (take care not to damage ESF).
  - Insert them into the Electrofusion Coupler [B] and proceed with welding ( follow product instruction ).
2. **CHECK THE ARROW ON THE SIDE FOR FLOW DIRECTION**  
Wait for the cooling time indicated on the label then proceed to **STARTING OPERATION (Point 2)**



**fig. 3**  
**[A]** Tapping-tee saddle  
**[B]** Electrofusion Coupler with ESF assembled  
**[C]** PE service line

## 2. STARTING OPERATION

1. **Pressurize the line** : open the valve downstream as slow as possible (at max 30%).
2. **Wait for the complete pressurization** of the line and then open the valve at 100%.

## 3. ESF TEST

Gradually open the service valve downstream until ESF shuts-off and cuts the flow.

## 4. REARMING OPERATION

**\* TO BE DONE BOTH AFTER ESF TEST AND ESF SHUT-OFF FOLLOWING PIPE DAMAGE \***

1. After repairing the damaged pipeline, close the valve downstream ESF.

**ESF WITH AUTO-REARMING:**

ESF automatically re-opens after a short time.

**ESF WITHOUT AUTO-REARMING:**

Re-equilibrate the pressure manually: inlet inert gas downstream ESF.

2. Follow the instructions at Point 2. STARTING OPERATION.

# 22. BUTT FUSION REPAIR PATCH

**ELOFIT INCHES BUTT FUSION REPAIR SLEEVE (EIBFRS)** is a safety/ repair system to be used when, in service, butt-welding cannot be guaranteed.

BFRS can be installed on pressurized pipe made out of PE4710, PE3408 and PE2708/PE2406.

The maximum network pressure allowed to weld the BFRS on the pipe depends of the polyethylene grade and SDR of pipe.

POLYETHYLENE GRADE	PRESSURE*
PE4710 (PE 100-SDR11)	124 psi - 10 bar
PE3408 (PE 80-SDR11)	60 psi - 5 bar
PE2708/2406 (PE80-SDR13.5)	60 psi - 5 bar
PE2708/2406 (PE80-SDR15.5)	14.5 psi - 1 bar
PE80 SDR11 (ALDYL)	60 psi - 5 bar

\* maximum pressure operating during the welding

**TOOLS (not included):**

**METAL CLAMPS**



**JUMPER CABLES**

(nr.1 long cable + nr.2 short cables)



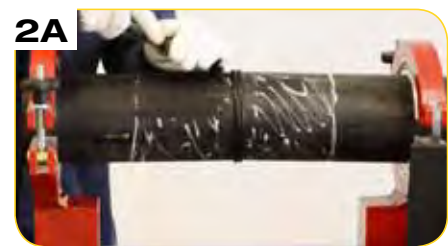
**FOLLOW THESE POINTS CAREFULLY**

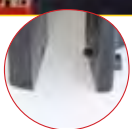
1. Measure half length of the repair sleeve and mark the distance on each side of the pipe, starting from the bead; extend the marks all across the circumference of the pipe and identify the welding area with a marker (1A, 1B, 1C).



**DO NOT REMOVE THE BEAD.**

2. Scrape the part of the pipe where the repair sleeve will be welded and clean it with with isopropanol and a soft wiping cotton cloth with no printing; wait until the clean parts are completely dry (2A, 2B).
  - Scrape 0.4" beyond the marked line.
  - Scrape as close as possible to the bead.
  - Take care not to damage the bead.





3. Mark on each side of the pipe a distance from the bead equal to half the length of the sleeve, so that the bead is in the middle of the sleeve.

4. Clean the inner part of the two half shells of the fitting with isopropanol and a soft wiping cotton cloth with no printing; wait until the clean parts are completely dry.

5. Install the two half shells on the pipe so that the bead is centered in the groove in the middle of the sleeve.



**FOR SOME ELECTROFUSION PROCESSORS THE TOP HALF OF THE SHELL MAY NEED TO BE ROTATED AT AN ANGLE TO MAKE CONNECTING THE PINS EASIER**

6. Put the metal clamps onto the plane parts of the lateral wings of the half shells. Tighten the bolts until the 1.614" (40 mm) **spacers "A"** can no longer rotate. Use a wrench with hexagonal head screw 19mm (metric).



**BEFORE TIGHTENING, CHECK THAT THE PINS BELOW THE SIDE FLAT AREAS PROPERLY FIT INTO THEIR GROOVES.**

## 7 PERFORM WELDING

6"IPS EIBFRS can be alternatively "ONE SHOT" welded: please refer to instructions on page 69.



- **BEFORE BEGINNING THE WELDING SEQUENCE, ALWAYS CHECK THE RELIABILITY OF THE POWER SUPPLY SYSTEM, TO MAKE SURE THERE ARE NO INTERRUPTIONS DUE TO LACK OF POWER.**
- **THE FITTINGS REQUIRE 4.0MM CONNECTORS.**
- **DON'T WELD IF WATER OR LEAKING GAS IS PRESENT.**
- **KEEP AT A SAFE DISTANCE DURING WELDING.**
- **PERFORM WELDING ONLY IN AUTOMATIC MODE THROUGH BARCODE SCAN: DO NOT PERFORM WELDING IN MANUAL MODE.**
- **ALWAYS CHECK THE WELDING PARAMETERS ON THE DISPLAY.**

Needed:

short jumper cables (x1)

long jumper cables (x1)

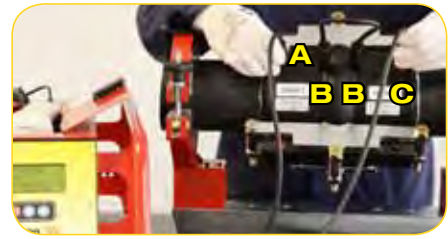
## 7.1 FUSION OF THE CENTRAL PARTS

### 7.1.1 UPPER CENTRAL PART

Connect the short jumper cable to the connector pins marked “B”; connect the two cables of the electrofusion machine to the connector pins marked “A” and “C”.

Scan the barcode marked “EIBFRSC” with the scanner to proceed with welding the upper central part of the repair sleeve on the pipe.

When the welding cycle is positively concluded, disconnect all the cables from the repair sleeve and proceed immediately to the following step.



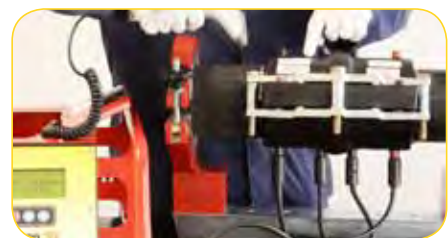
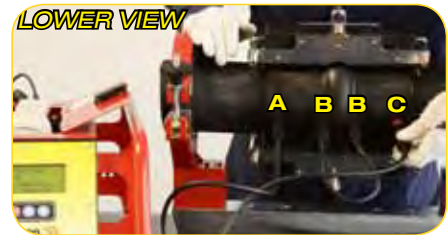
- AT THE END OF EACH WELDING CYCLE, MARK THE ACTUAL TIME (HOURS AND MINUTES) ON THE MODULES.
- DO NOT REMOVE METAL CLAMPS.
- PROCEED IMMEDIATELY TO THE FOLLOWING STEP (DON'T WAIT FOR COOLING TIME).

### 7.1.2 LOWER CENTRAL PART

Connect the short jumper cable to the connector pins marked “B”; connect the two cables of the electrofusion machine to the connector pins marked “A” and “C”.

Scan again the barcode marked “EIBFRSC” with the scanner to proceed with welding the lower central part of the repair sleeve on the pipe.

When the welding cycle is positively concluded, disconnect all the cables from the repair sleeve and proceed immediately to the following step.



- AT THE END OF EACH WELDING CYCLE, MARK THE ACTUAL TIME (HOURS AND MINUTES) ON THE MODULES.
- DO NOT REMOVE METAL CLAMPS.
- PROCEED IMMEDIATELY TO THE FOLLOWING STEP (DON'T WAIT FOR COOLING TIME).



7.2.1



7.2.1



7.2.2



7.2.2



7.2.3

## 7.2 FUSION OF THE LATERAL WINGS

**7.2.1** Connect the long jumper cable to the connector pins marked “2” on both lateral wings (upper and lower side).

**7.2.2** Connect the two cables of the electrofusion machine to the connector pins marked “1” on both lateral wings (upper and lower side).

**7.2.3** Scan the barcode marked “EIBFRSL” with the scanner and proceed with welding the lateral wings of the repair sleeve.

**7.2.4** When the welding cycle is positively concluded, wait for the completion of the cooling time indicated on the BARCODE (not less than 30 min), then remove the metal clamps.

- AT THE END OF EACH WELDING CYCLE, MARK THE ACTUAL TIME (HOURS AND MINUTES) ON THE MODULE.
- DON'T STRESS OR BURY THE PIPELINE BEFORE THE COMPLETION OF THE COOLING TIME INDICATED ON THE BARCODE.
- DO NOT REMOVE METAL CLAMPS BEFORE THE COMPLETION OF THE COOLING TIME.
- IN CASE OF WELDING INTERRUPTION OF ONE OF THE CENTRAL PARTS DUE TO LACK OF POWER, WAIT FOR THE FITTING TO COOL DOWN FOR NOT LESS THAN 1 HOUR, THEN RE-START FROM THE BEGINNING THE WELDING CYCLE OF THE PART AND CONTINUE WITH WELDING THE OTHER PARTS FOLLOWING THE INSTRUCTIONS.
- IN CASE OF WELDING INTERRUPTION OF THE LATERAL WINGS DUE TO LACK OF POWER, WAIT FOR 10 MINUTES THAN RE-START THE WELDING CYCLE. IF IT IS IMPOSSIBLE TO RESTART THE WELDING CYCLE AFTER 10 MINUTES, PLEASE CONTACT THE SUPPLIER FOR WELDING SUPPORT.



## 'ONE-SHOT' WELDING 6"IPS VERSION ONLY

**TOOLS (not included):**

**JUMPER CABLES**  
(nr.1 long cable + nr.2 short cables)

**RED TRIPLE CABLE**

**BLACK TRIPLE CABLE**



- BEFORE BEGINNING THE WELDING SEQUENCE, ALWAYS CHECK THE RELIABILITY OF THE POWER SUPPLY SYSTEM, TO MAKE SURE THERE ARE NO INTERRUPTIONS DUE TO LACK OF POWER.
- THE FITTINGS REQUIRE 4.0mm CONNECTORS.
- DON'T WELD IF WATER OR LEAKING GAS IS PRESENT
- KEEP AT A SAFE DISTANCE DURING WELDING.
- PERFORM "ONE-SHOT" WELDING ONLY IN AUTOMATIC MODE THROUGH BARCODE SCAN: DO NOT PERFORM 'ONE-SHOT' WELDING IN MANUAL MODE.
- ALWAYS CHECK THE WELDING PARAMETERS ON THE DISPLAY.

Needed:

short jumper cables (x2)

long jumper cables (x1)

red triple cable (x1)

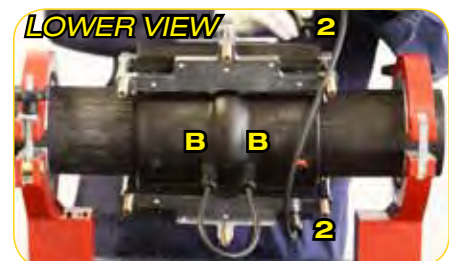
black triple cable (x1)

### 1. CONNECT THE CABLES TO THE LOWER PART

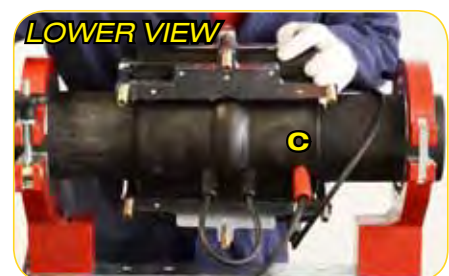
**1.1** Connect the short jumper cable to the black central pins marked '**B**'; connect the long jumper cable to the black pins marked '**2**' on the lateral wings (first pin: lower face; second pin: upper face).

**1.2** Connect one connector of the red triple cable to the red pin marked '**C**' on the lower central part.

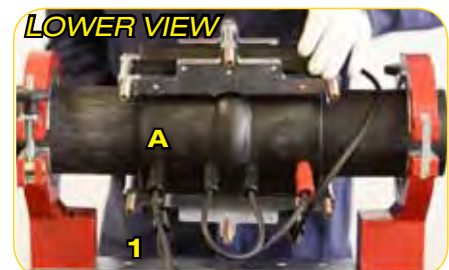
**1.3** Connect one connector of the black triple cable to the black pin marked '**A**' on the lower central part; connect the second connector of the black triple cable to the black pin marked '**1**' on the lower lateral wing.



1.1



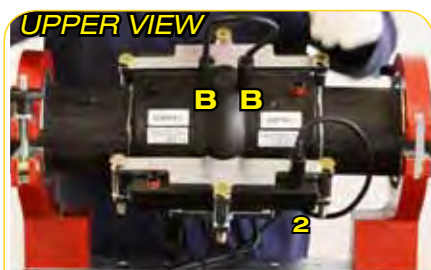
1.2



1.3

## 2.1 2.

### CONNECT THE CABLES TO THE UPPER PART



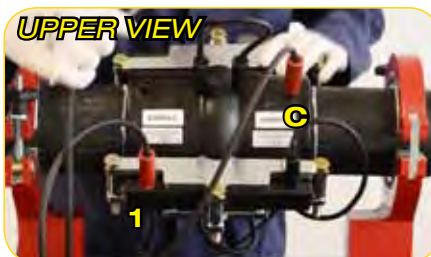
**REMEMBER:**  
Pin 2 was connected on point 1.2 (Lower view)

**2.1** Connect the short jumper cable to the black central pins marked 'B'.

**2.2** Connect the second connector of the red triple cable to the red pin marked 'C' on the upper central part; connect the third connector of the red triple cable to the red pin marked '1' on the upper lateral wing.

**2.3** Connect the third connector of the black triple cable to the black pin marked 'A' on the upper central part.

## 2.2 3.

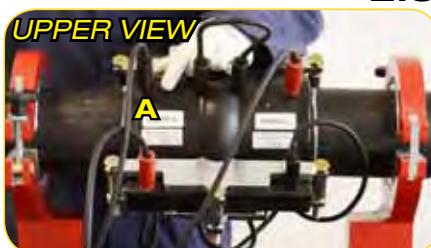


Connect the 2 cables of the electrofusion machine to the connectors slots on both red and black triple cables.



**BEFORE STARTING THE WELDING CYCLE, CHECK THAT THE CONNECTION OF THE MODULES CORRESPONDS WITH THE INSTRUCTIONS.**

## 2.3 4.



Perform welding: scan the special barcode below with the scanner and proceed with welding. After the welding cycle is positively completed, disconnect all the cables from the fitting.

EIBFRS6" IPS - 44v - 265s - c.t. 60 min.



950705368603440616265529

## 2.4



## 5.

Wait for the completion of the cooling time indicated on the barcode, then remove the metal clamps.

- **DO NOT REMOVE METAL CLAMPS BEFORE THE COMPLETION OF THE COOLING TIME.**
- **DON'T STRESS OR BURY THE PIPELINE BEFORE THE COMPLETION OF THE COOLING TIME INDICATED ON THE BARCODE.**
- **IN CASE OF WELDING INTERRUPTION DUE TO LACK OF POWER, WAIT FOR THE FITTINGS TO COOL DOWN FOR NOT LESS THAN 1 HOUR, THEN RE-START THE WELDING CYCLE FROM THE BEGINNING.**



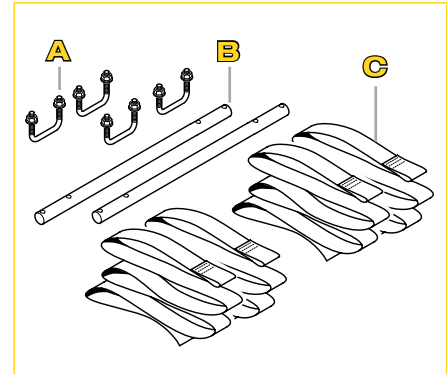
# 23. REPAIR SADDLES WITH BELTS

Repair saddles must only be used for localized damage on pipe surface; don't install in case of extended notches.

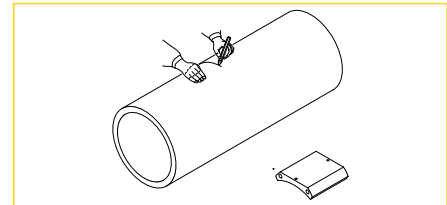
**Repair Saddles  $\varnothing \geq 8'' \times 6''$  - 200/160 mm** are supplied with the necessary equipment for a complete installation.

**THE KIT INCLUDES:**

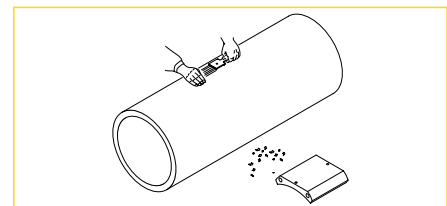
- A.** nr. 4 threaded fork pivots with nuts
- B.** nr. 2 metal bars
- C.** A pair of adjustable belts



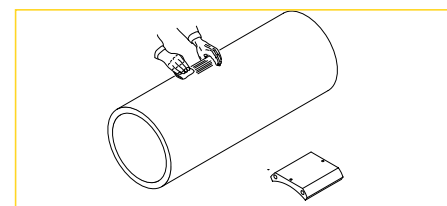
**1.** Mark the welding area on the main pipe with a wax crayon or marker, all around the damage to be repaired.



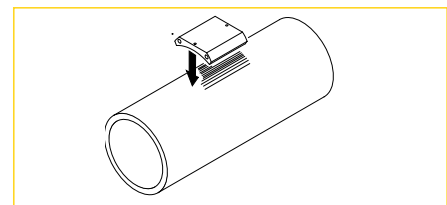
**2.** Scrape carefully the surface of the pipe with a hand scraper to remove the oxidized PE layer. Take care not to damage the pipe further.



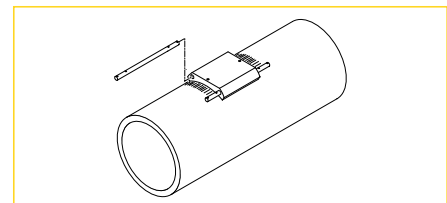
**3.** Clean the external surface of the pipe and the welding area of the saddle with isopropanol and a soft wiping cotton cloth without any printing. Wait until the clean parts are completely dry.

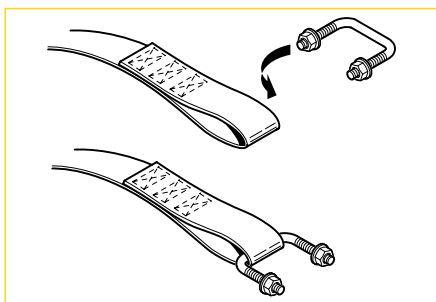


**4.** Immediately after scraping and cleaning the areas to be welded, install the saddle onto the pipe. Be careful not to contaminate the previously cleaned surfaces.

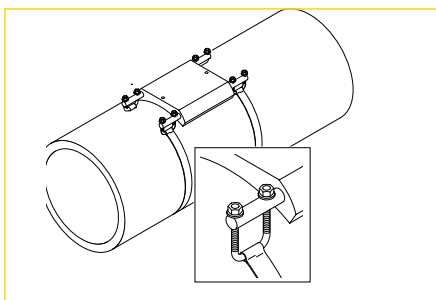


**5.** Insert the two metal bars supplied in the package in to the side holes.

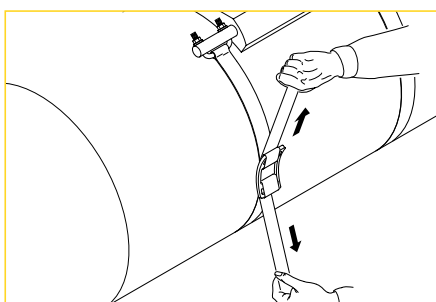




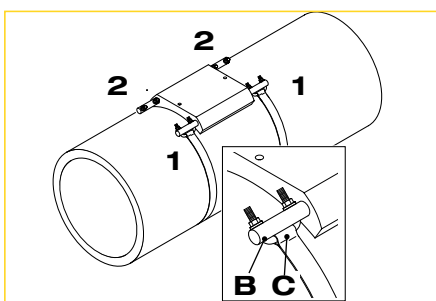
6. Insert each of the four fork pivots in to the respective belt ends.



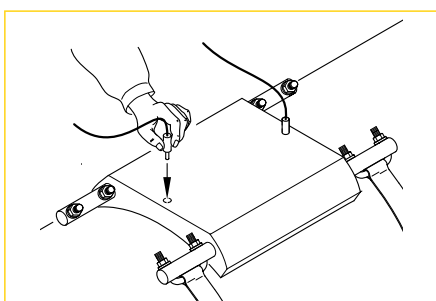
7. Insert one pair of fork pivots into the two parallel ends of the metal bars. Join the four nuts and keep them at the end of the bolt threads level (don't tighten them). Repeat this operation using the second pair of fork pivots.



8. Pull both the free belts until the band perfectly fits to the pipe.



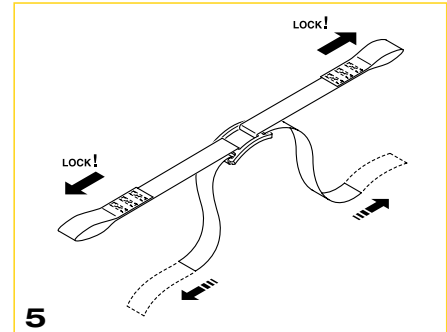
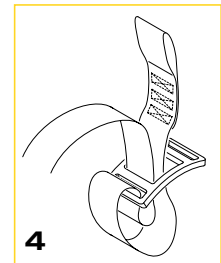
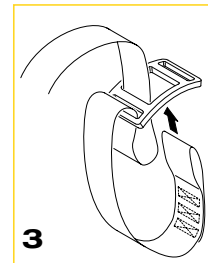
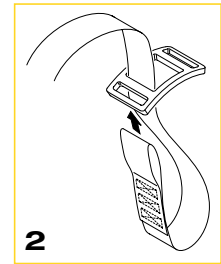
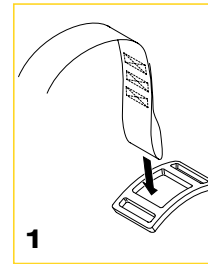
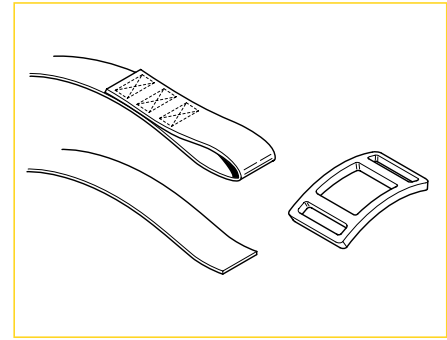
9. Tighten the bolts with a wrench until the metal bar (B) and the belt (C) are touching together. Check that the belts are firmly tightened. Important: tighten the nuts of the first bar (1) and then those of the second bar (2). The saddle must fit the pipe.



10. Connect the two cables of the electrofusion machine to the connectors of the saddle, scan the barcode with the barcode scanner or enter the welding parameters manually (Refer to Chapter 2). After completing the welding process, verify that no material has leaked out of the fusion zone between the pipe and the fitting and wait for the completion of the cooling time indicated on the barcode (see Table 15, pag.25).

## 23.1 ASSEMBLY OF THE FIXING BELT

1. One end of the belt is smooth whereas the other end has a triple stitching forming a ring. The metal buckle is slightly curved, has one large central and two smaller lateral square spaces.
2. Insert one ring into the central space from top to bottom (1) and then from bottom to top by inserting it in the smaller lateral space (2) and then again from bottom to top inside the big central square space (3).
3. Repeat the operation with the second belt and then again with the second pair of belts.
4. Check if the two belts have been inserted correctly by pulling them apart with the rings towards the outside. If the operation has been carried out properly, the belts will not slip and the two smooth ends will be free to move to allow their length to be adjusted.
5. If the belts have not been inserted correctly inside the buckle, during the assembly the belts will not be tight enough to complete the welding process correctly.





# 24. ELOFIT 180° VARIABLE LENGTH REPAIR SLEEVE (EIVLRS)

The **VARIABLE LENGTH REPAIR SLEEVE** is a modular system of electrofusion shells that can be installed contiguously and welded on pipes that have notches, scrapes or damage along the axis.

The standard assembly has 2 modules (identified as EIVLRS **I** and EIVLRS **T**): between them it's possible to add the necessary number of additional middle modules (separately available, identified as EIVLRS **M**).

The maximum network pressure allowed to weld the fitting on the pipe depends of the polyethylene grade and SDR of pipe.

POLYETHYLENE GRADE	PRESSURE*
PE4710 PE 100-SDR11	124 psi
PE3408 PE 80-SDR11	60 psi
PE2708/2406 PE80-SDR13.5	60 psi
PE2708/2406 PE80-SDR15.5	14.5 psi
PE80 (ALDYL)	60 psi

\* maximum pressure operating during the welding



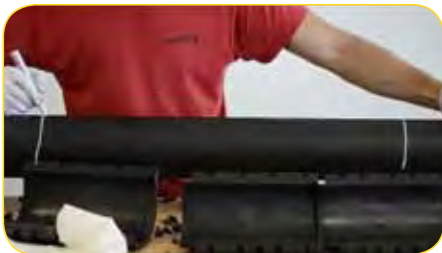
1. Measure and mark the length of the damage of the pipe and calculate the appropriate number of sleeve modules to completely cover it.
2. Measure the total length of the sleeve modules and mark it on the pipe, near the damage. Minimum distance required for the fitting to extend beyond the damaged area: 2,36" (60mm).
3. Scrape the part of the pipe where the variable length repair sleeve will be welded, over and all along the damage to be repaired. Use a hand scraper: scrape the pipe at 180° across the damage. Scrape 0.4" beyond the marked line.



**TAKE CARE NOT TO DAMAGE THE PIPE FURTHER.**



**4.** Clean the scraped part of the pipe and the welding areas of the sleeve modules with isopropanol and a soft wiping cotton cloth with no printing; wait until the clean parts are completely dry.



**5.** Mark on the scraped pipe a distance equal to the whole length of the assembled sleeves, so that the damage is well centered and surrounded. Take care not to contaminate the previously cleaned surfaces.

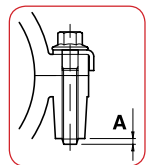


**6.** Install each single module separately on the pipe, starting from one end of the scraped area: place the EIVLRS I module on the pipe and align it to the marked line.

Place the first underclamp on the very end of the assembly: hook the square holes of the underclamp to the teeth on the side of the module; align the two screws to the corresponding holes, line up the metal spacer and use a wrench to tighten the two screws until they are in position **A** in the lower part (feel the screws sticking out of the bottom - see figure in the circles below).



Repeat the operation with the second underclamp in the consecutive position.



**7.** If the middle modules EIVLRS **M** aren't necessary, skip to Step 10, otherwise proceed to the following Step 8.

**8.** Place the middle module EIVLRS **M** on the scraped pipe, next to the one just installed: the lip at the end of the module must overlap the protruding edge of the next one (see figure in the circles below). Install the first underclamp across the two adjacent modules (follow the instruction on Step 6).

Then install the second underclamp in the consecutive position (follow the instruction on Step 6).

Then install the second underclamp in the consecutive position (follow the instruction on Step 6).

9. Repeat the instructions on Step 8 for all the necessary middle modules EIVLRS **M**.



**IN CASE OF 4 OR MORE MODULES, PLEASE CONTACT THE SUPPLIER FOR WELDING ASSISTANCE.**

10. Place the terminal module EIVLRS **T** on the scraped pipe, adjacent to the next just installed: the lip at the end of the module must overlap the protruding edge of the next one. Install the first underclamp across the two adjacent modules (follow the instruction on Step 6).

Then install the second and third underclamps in the consecutive positions (follow the instruction on Step 6).

The terminal module EIVLRS **T** must always be the final module installed.



- **BEFORE BEGINNING THE WELDING SEQUENCE, ALWAYS CHECK THE RELIABILITY OF THE POWER SUPPLY SYSTEM, TO MAKE SURE THERE ARE NO INTERRUPTIONS DUE TO LACK OF POWER.**
- **THE FITTINGS REQUIRE 4.0mm CONNECTORS.**
- **DON'T WELD IN CASE OF GAS OR WATER LEAKAGE**
- **KEEP AT A SAFE DISTANCE DURING WELDING.**
- **PERFORM WELDING ONLY IN AUTOMATIC MODE THROUGH BAR-CODE SCAN: DO NOT PERFORM WELDING IN MANUAL MODE.**
- **ALWAYS CHECK THE WELDING PARAMETERS ON THE DISPLAY.**

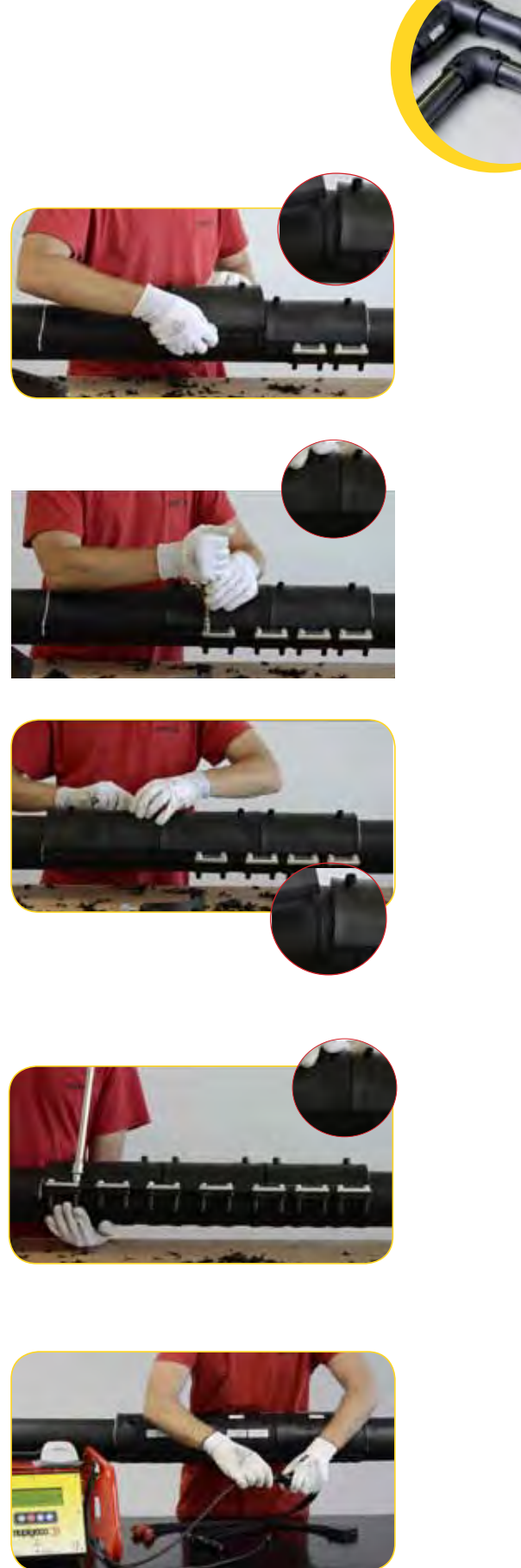
**TOOLS (not included):**

**RED TRIPLE CABLE**

**BLACK TRIPLE CABLE**



11. Connect one cable of the electrofusion machine to the connector slot on the black triple cable.





- 12.** Connect each connector of the black triple cable to the first pin marked “A” of each module.



- 13.** Connect the other cable of the electrofusion machine to the connector slot on the red triple cable.



- 14.** Connect each connector of the red triple cable to the second pin marked “B” of each module.



- 15.** Perform welding: scan with the optical pen the barcode marked “ONE-SHOT 2 FITTINGS” (on EIVLRS **I** module) in case of 2 modules, or the barcode marked “ONE-SHOT 3 FITTINGS” (on EIVLRS **M** module) in case of 3 modules, and proceed with welding.



**IN CASE OF 4 OR MORE MODULES, PLEASE CONTACT THE SUPPLIER FOR WELDING ASSISTANCE.**

- 16.** After the welding cycle is positively completed, mark the actual time on the modules and disconnect all the cables.



**IN CASE OF WELDING INTERRUPTION DUE TO LACK OF POWER, WAIT FOR THE FITTINGS TO COOL DOWN FOR NOT LESS THAN 1 HOUR, THEN RE-START THE WELDING CYCLE FROM THE BEGINNING.**

- 17.** Wait for the completion of the cooling time indicated on the barcode; then it’s possible to move and bury the pipeline.



**DON'T STRESS OR BURY THE PIPELINE BEFORE THE COMPLETION OF THE COOLING TIME INDICATED ON THE BARCODE.**





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