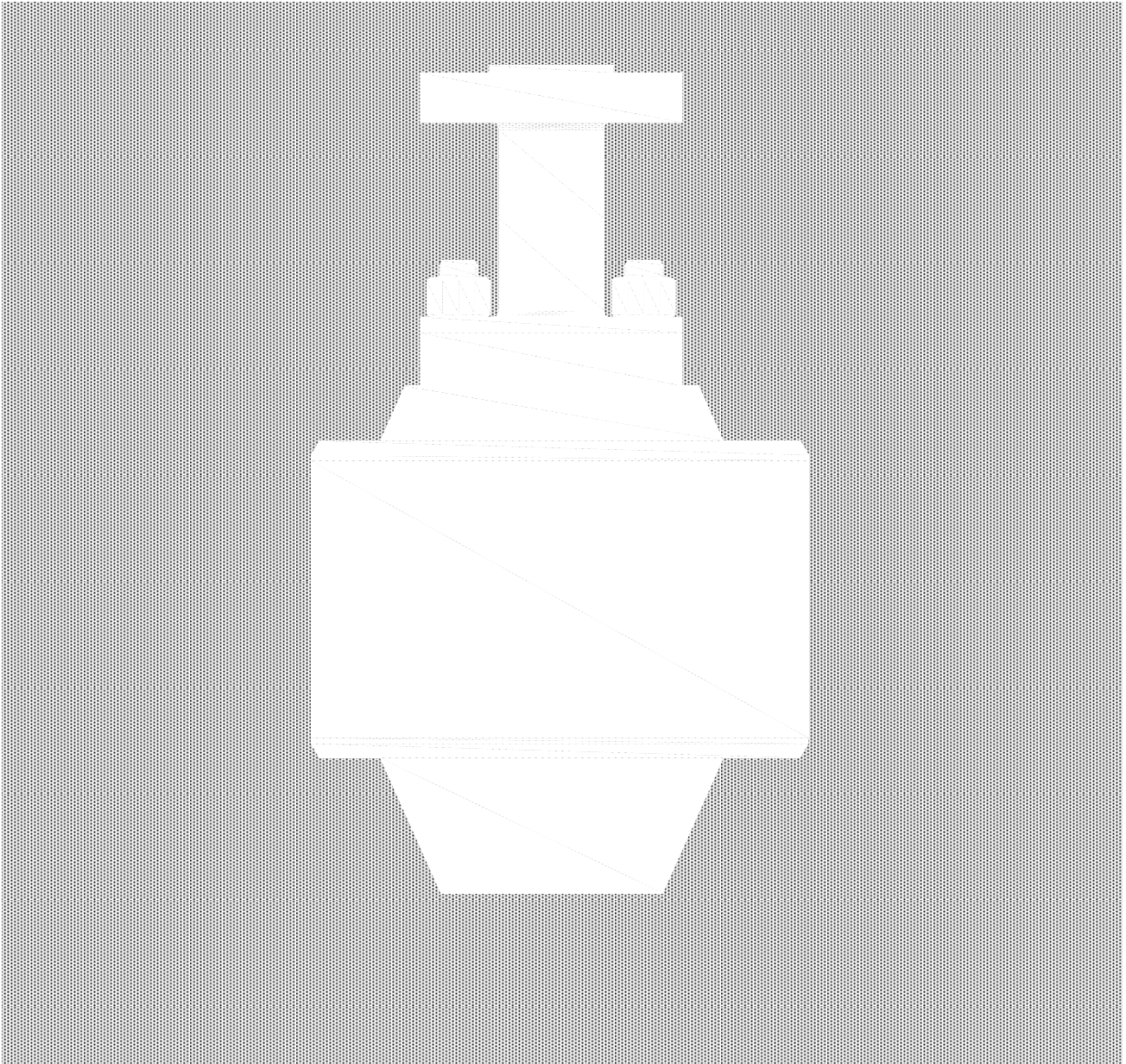




# INSTRUCTION

## For the installation and maintenance DV Varivent





# INSTRUCTION

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### 1. GENERAL INFORMATION:

#### 1.1 – RIGHT OF MODIFICATION AND COPYRIGHT

The regulations, standards etc. quoted in these instructions are valid at the time of preparation of this document and are not subsequently updated. It is the duty of the user to take full responsibility for applying the most up-to-date version of the standards and regulations in question.

The supplier reserves the right to make changes and technical improvements to data and information Whenever it sees fit to do so. The user shall on no account be entitled to claim a right of modification or Improvement in relation to valves already supplied.

### 2. WARRANTY

The extent and duration of the warranty are defined in the manufacturer's "General Conditions of Sale." the applicable conditions are those stipulated in the most up-to-date version in existence at the time of delivery.

The warranty does not cover, amongst other cases, damages to valves caused by the following:

- ° Ignorance of or non-compliance with these instructions for use!
- ° The work of personnel insufficiently qualified to undertake fitting, use or maintenance.
- ° Normal wear.
- ° Erroneous or negligent use of the valves.

The warranty shall not be valid and the manufacturer shall accept no responsibility in the event of:

- ° Non-compliance with regulations for the prevention of accidents and/or safety standards.
- ° Imperfect installation, poor commissioning and incorrect use.
- ° Improper or incorrect use, inappropriate application or work conditions differing from those agreed.
- ° The user shall bear sole responsibility in the event of physical and/or material damage deriving from failure to observe the above.

### 3. SCOPE OF THESE INSTRUCTIONS

These instructions relate to **fixed area DV VARIVENT**.



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#### 4. SAFETY SIGNS AND WARNINGS SYSTEM

Where appropriate, safety signs appear in the rectangular warning boxes in the margins of this manual. The rectangular warning boxes are laid out vertically (as shown in the examples below) and consist of four boxes containing messages highlighting:

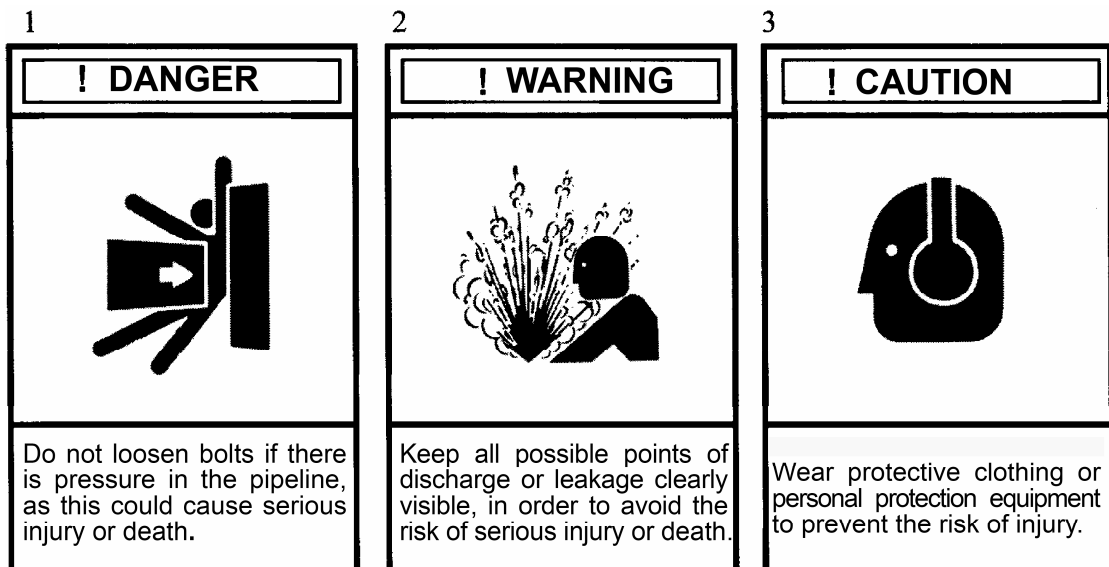
- Level of seriousness
- Nature of risk
- The consequences of interaction with the hazard for personnel or products
- Instructions, if necessary, on how to avoid the hazard

The top box contains a warning word (DANGER-WARNING-CAUTION-ATTENTION), which indicates the Level of seriousness of the risk.

The central box contains a drawing indicating the nature of the hazard and the possible consequences, for personnel or property, of interaction with the hazard. In some cases of hazards to personnel, the drawing may suggest what preventive measures can be taken, such as wearing protective clothing, for example.

The bottom box may contain a message with instructions on how to avoid the hazard. In the case of hazards to personnel, the message may also contain a more precise definition of the hazard and its consequences for personnel.

- 1) **DANGER** – Immediate hazard, definitely capable of causing serious injury or death.
- 2) **WARNING** – Hazard or hazardous practice that could cause serious injury or death.
- 3) **CAUTION** – Hazard or hazardous practice that could cause mild injury.





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#### 5. NOTICE ON SAFETY

Thorough checking and maintenance play a key role in ensuring the safe, reliable operation of all valves. The service procedures recommended by CARRARO and described in this manual constitute effective methods for performing the necessary maintenance operations. This service manual contains various warnings and invitations to take care, which must be read carefully in order to minimize the risk of injury to personnel and the possibility of adopting incorrect work methods which may damage the valves or make their operation unsafe. It is also important to note that these warnings can never be exhaustive. CARRARO is not in a position to know, assess and warn customers or users of all the conceivable methods with which servicing may be carried out and all the potentially hazardous consequences of such methods. CARRARO has not therefore attempted to undertake such a task. Anyone using a service procedure or tool not recommended by CARRARO must therefore make certain that neither their own safety nor that of other people, nor the safety or correct operation of the valve is put at risk by the chosen work method. If in doubt about a given procedure, contact CARRARO for advice.

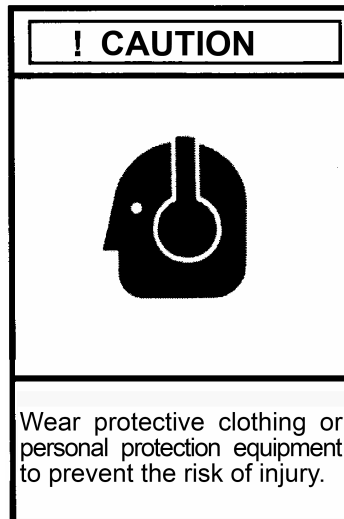
The testing, installation or disassembly of valves or accessories may lead to contact with fluid at high pressures or temperatures and/or corrosive or erosive fluid, and fluid capable of generating a potentially explosive atmosphere.

Comprehensive precautions must therefore be taken to prevent injury to personnel during testing, installation or removal; including, by way of example only: ear defenders, protective goggles, protective clothing such as gloves, etc., regardless of whether the persons in question are located directly in the work zone or in the surrounding area.

In view of the widely varying conditions and circumstances that may arise in relation to the operations to be carried out on products, and of the possible hazardous consequences of the way in which they are conducted, CARRARO is not in a position to foresee everything that might pose a risk of injury to persons or damage to property, and can therefore only offer, by way of assistance, this reminder to take care and a few suggestions (set out below) on safety precautions.

It is the responsibility of the user of CARRARO products to attend to the training of the personnel assigned to their use.

It is imperative that such personnel acquire a full knowledge of the instructions relating to the product and of this manual.





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#### 6. SAFETY PRECAUTIONS

**! DANGER**




Lower the pressure and keep at a safe distance from the outlet when working on a valve.

Always follow the safety regulations applicable to the plant and observe the following precautions:

°Wear protective clothing. Hot water causes burns and superheated vapour is invisible.

°When disassembling valves, wear protective clothing so as to prevent exposure to splashes of any process fluid that may be left inside the valves. Bear in mind that such fluid could generate a potentially explosive mixture.

**! CAUTION**




Wear the appropriate personal protection equipment to prevent possible injury.

° Before starting disassembly, make certain that the valve is isolated from any source of pressure that may exist within the system.

° Carry out checking/maintenance of valves at least once every twelve months.

° The outer surfaces of valves reach temperatures approximately equal to the temperature of the fluid flowing through them. For this reason, if fitting a valve in a potentially explosive atmosphere, check that the explosion point of the atmosphere surrounding the valve is sufficiently higher than the temperature of the fluid handled by the system, and prevent deposits of dust from forming on the outside of the valve.

**! WARNING**



Keep all possible points of discharge or leakage clearly visible, in order to avoid the risk of serious injury or death.

° In the connection between the valve and line, ensure the equipotentiality of the system in order to prevent the accumulation of electro-static charges on the outer surfaces of the plant, which could act as an effective trigger in a potentially explosive atmosphere.

° Before carrying out any work on valve components, consult CARRARO.



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#### 7. INSTALLATION

Before installation, check the Varivent for any visible damage. Make sure that protective covers are removed and that butt-welded ends and flange faces are clean and without blemish. Any damage to the unit should be reported immediately to Carraro Srl. Check that the information on the documentation, identification plate and tag number complies with the order specification.

Remove the Varivent carefully from its packaging, lifting by means of straps around the body, or use the eyebolt if provided. Do not use the water inlet connection for lifting.

The minimum pipe run, required downstream varies with each individual application and it would be specified by Carraro Srl at the ENQUIRY STAGE. This straight run is needed to prevent erosion due to impact of water droplets against pipe, valves and fittings.

Upstream straight run is normally 1 meter and the outlet straight run 3 meters or 15DN, as a minimum.

The distance from the Varivent to the temperature sensor is nominally 5 or 7 meters, although the distance specific to the application would be advised by Carraro Srl at the Enquiry stage. Longer distances will ensure that full evaporation of the water will take place at lower steam velocities.

The temperature sensor should be located in the upper half of the pipe, avoid branching of the steam pipeline between the Varivent and the sensor.

For the installation of the Varivent use gaskets and bolting material in accordance with the relevant piping code, for example ANSI B31.3 or DIN/TRD.

When supplied with butt-welded connections, Varivent should be welded inline using proper weld procedures. Carefully check the material compatibility of both body and piping. In case of doubt consult Carraro Srl.

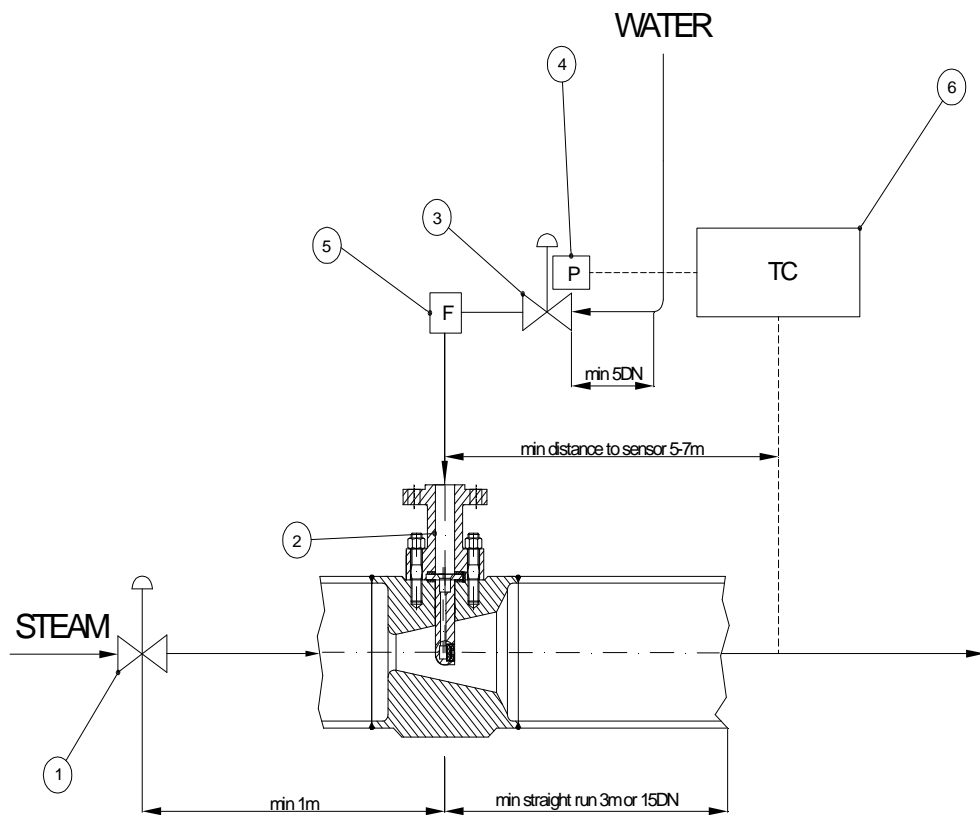
Post Weld Heat Treatment should be done with the pipeline filled with an inert gas. Oxidation of the vena contract area may lead to significant higher pressure drop over the Varivent than calculated.

For an installation example, see Fig.1/page 8.



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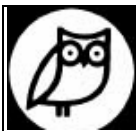
## For the installation and maintenance DV Varivent



**FIG.1 – SCHEMATIC PLANT**

ITEM	PART NAME
1	Pressure reducing valve
2	DV Varivent
3	Water control valve
4	Positioner
5	Filter
6	Temperature controller





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Pipe bends should always be of the long radius type to assist in keeping the water droplets in suspension, until complete evaporation has taken place. Installation may be in vertical or horizontal piping, but the direction is marked on the Varivent body by an arrow.

The water supply should be of a good quality, clean and filtered for example boiler feed water and it should have a constant pressure as specified in the order documents. Each water supply line should be protected with its own individual strainer (Item 5 fig.1) with a maximum element perforation size of 0,1 mm.

As in the case of the steam pipeline, use gasket and bolting in accordance with the relevant piping code. Flush out the water line before connecting to the Varivent mounting flange.

#### 7.1 START-UP

Ensure that all components are installed correctly. Connection of electrical supplies and instrument air piping should be in accordance with the manufacturer's instruction manual. Verify and adjust, if necessary, set points for filter regulator (Item 5 fig.1) and valve positioned (Item 4 fig1), following the manufacturer's recommendations. Similarly, calibrate the temperature transmitter/controller (Item 6 fig1), verifying automatic response to temperature changes.

Warm the steam main and open the valve in the water supply. Check the water pressure at the Varivent. Verify the operation of the temperature transmitter and controller by manually increasing and decreasing the output signal and observing indicated and recorded temperatures. When satisfactory coordination between instrument signals and temperature is attained, adjustment of the set point can be made and the system transferred to automatic operation. It is advisable to record the various steam coordinates, over a sustained period, to verify operation, adjusting where necessary.



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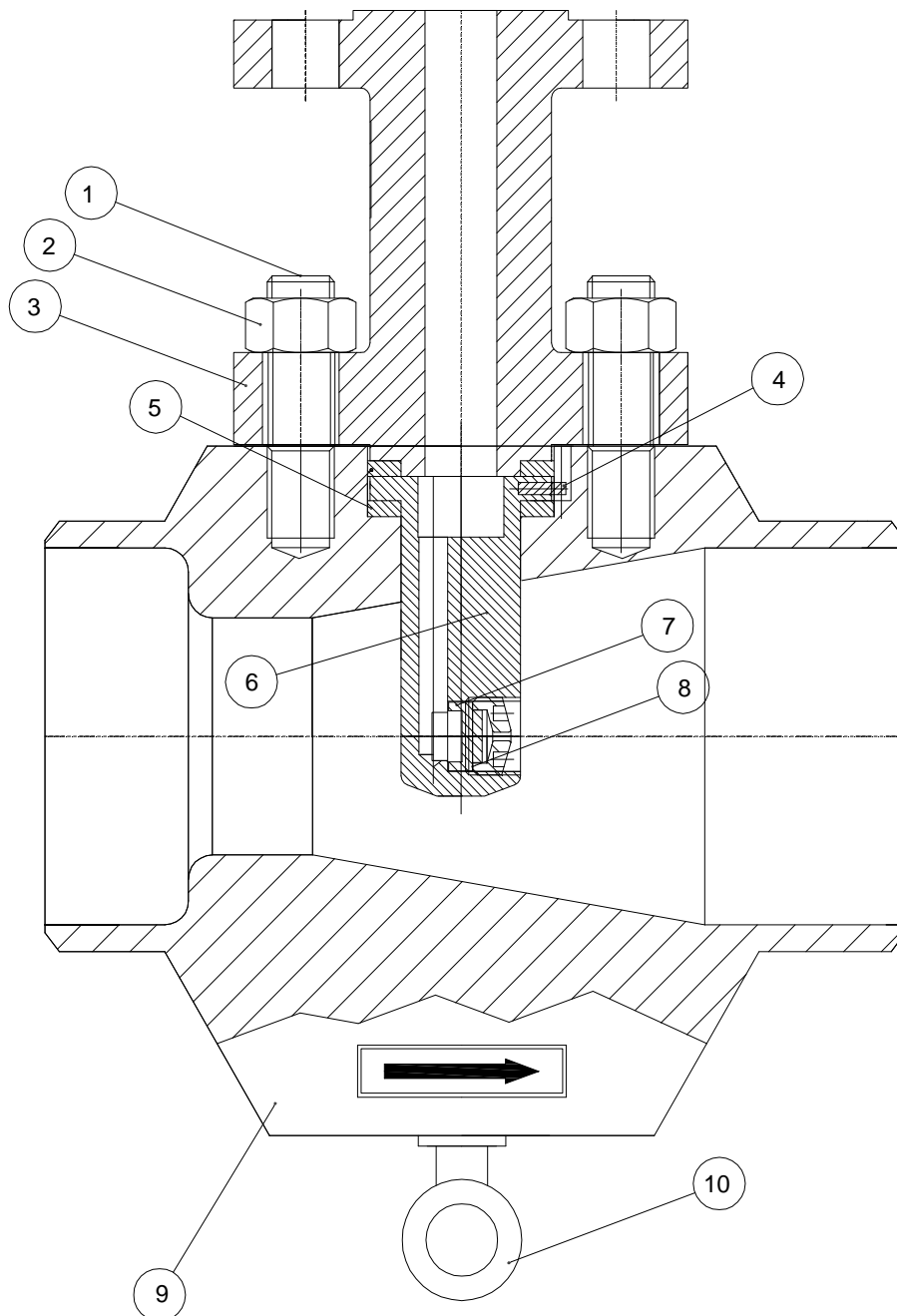


FIG.2 – VARIVENT



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ITEM	PART NAME
1	<b>Stud</b>
2	<b>Nut</b>
3	<b>Water flange</b>
4	<b>Pin</b>
5	<b>Gasket</b>
6	<b>Pipe</b>
7	<b>Vortex ring</b>
8	<b>Nozzle</b>
9	<b>Body</b>
10	<b>Eyebolt</b>



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#### 8 MAINTENANCE

**Note:**

The maintenance of the desuperheater is simple and no requires special tools or training. Take care during any maintenance , especially when working with grinders , compressed air and rotating machinery . And essential that safety glasses and work clothes are used in accordance with standard safety procedures. In case of doubt , consult your supervisor or security officer before starting any work on the equipment.

**Removal:**

Before removing from the system the desuperheater or beginning maintenance in line, check that the steam pipes and water are completely depressurized , drained and vented . Ventilate and remove the air supply line instrumentation. Unscrew the flange bolts of water and steam from the plant and remove the desuperheater

The desuperheater can now be removed from the system . It is recommended to carry the desuperheater in a workshop that has a handy workbench and a vise. Lift the unit by means of straps wrapping around the body, or use the eyebolt.

**Injection nozzle:**

The water injection nozzle is removable and can be ordered as a spare part complete by Carraro Srl.

**Re-installation**

When re- installing the desuperheater make sure that the opening point of the nozzles is in the same direction of flow of steam. Use a nickel compound at high temperature on the bolted flange . Do not re use the old graphite gaskets but replace them during the review of the desuperheater.

#### 9 SPARE PARTS

Make sure that the identification number (indicated on the label) is verified and specified when ordering spare parts. The recommended spare parts are the gaskets and the injection nozzles (pipe, vortex ring, nozzle and pin)

#### 10 STORAGE PROCEDURE

When you receive a Varivent check that there are not any damages on the packaging that can be occur during transit.

Any damage to the container and packaging must be adjusted to prevent the presence of dust or water , before putting the equipment into storage.

Check the information on the nameplate and documentation , and return the unit in its packaging , with its protections , on the packaging

For short term storage , up to 6 months , there are not required special measures of conservation .

Store the unit in its original packaging indoors in a clean and dry ambient

If outdoor storage is carried out , the packing case , it must be enclosed in a waterproof coating .



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For long-term storage use only a closed and dry. Apply suitable grease on the machined surfaces . Store in its original packaging and inspect every 3 months to make sure there has not been any deterioration..

#### 11 REMOVING THE PACKAGING

Desuperheaters Carraro are packed with the utmost care in wooden crates or cardboard boxes in order to have maximum protection during transport to place of installation. After the hydrostatic test , is made to slide inside the desuperheater a protective agent with the purpose of protecting the inner surface erosion. Any damage occurred during transport, should be immediately reported to the transport company or a representative Carraro. Unpack with the utmost care, then verify that all exterior surfaces for damage.

#### 12 REPAIRS

- 12.1 If you cannot remove the problem , send the desuperheater damaged the factory with a detailed description of the problem .
- 12.2 In order to receive information or replacement parts, always include the serial number of this on the label affixed to the valve or printed on the outer surface of the flange.
- 12.3 To make sure that the valves are working properly covered in this manual , contact your authorized service center or personnel Carraro with original spare parts.



#### **ATTENTION!**

**The manufacturer declines all responsibility for modifications to the product or actions not contemplated in this manual.**