

GENERAL OPERATIONAL & MAINTENANCE MANUAL



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GENERAL OVERVIEW

This manual is designed to provide a full operational and maintenance overview for the following range of IWM equipment.



Continuous Sanitizers

Buggy/ Bin Washers

Tray Washers

Rack Washers

Dolav Washers

Keg Washers



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NMM v.1.8

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INTRODUCTION

Objectives of this manual:

1. Operation of IWM machinery in a safe manner
2. Maintain cleaning efficiency of machine
3. Technical details

All IWM machines are built to a very high specification using the finest components and are designed to operate with the minimum of maintenance. All our machines will give many trouble free years of operation providing simple routine cleaning and maintenance is carried out.

In the majority of cases a drop off in performance and breakdowns are caused by neglect. To maintain maximum efficiency and peak machine operation, machine should be fully cleaned down at the end of each shift.

Remember - if cleaning is not carried out effectively, it has a spiralling effect and makes the machine doubly difficult to clean the next time.

SUPPLIES TO EQUIPMENT

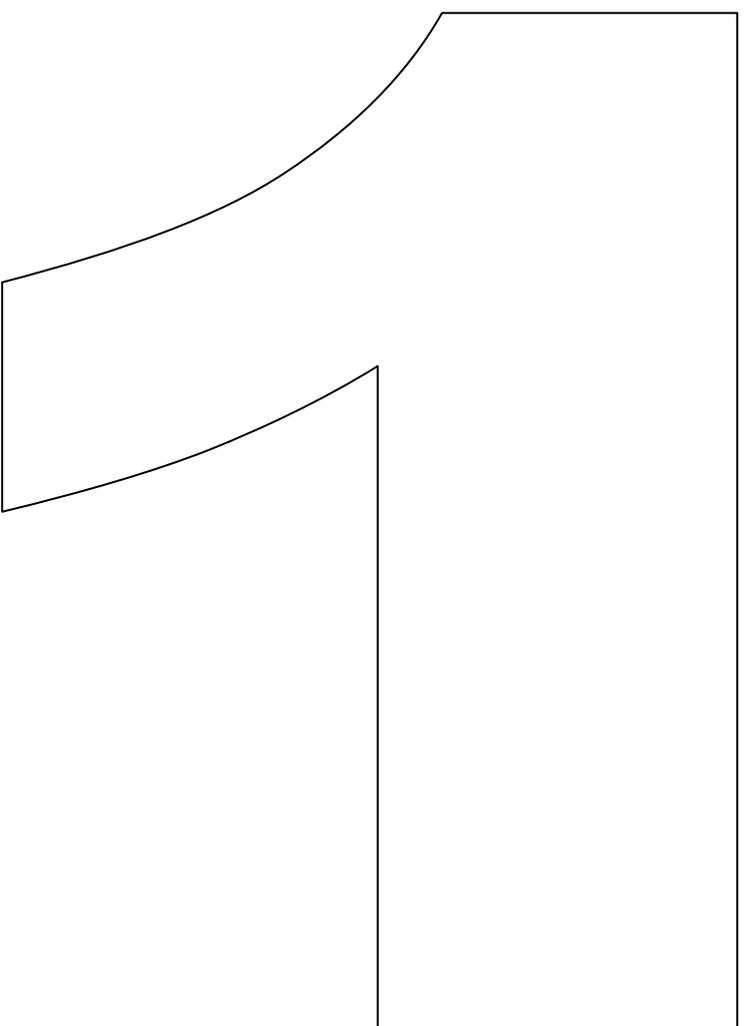
All final supply connections to IWM equipment should be completed by competent, qualified personal or contractors, in accordance with IWM requirements.

Optimum IWM equipment performance and life will be achieved by the use of soft water. If soft water is not available from mains, customers are advised to supply machine via commercial water softening unit.

It is the responsibility of the customer to ensure that the machine is in a safe, stable condition prior to operation.

If in any doubt about machine set-up, contact IWM service department, who will be pleased to assist.

SECTION ONE: MACHINE SPECIFIC DETAILS





TLZ 11

MICROPROCESSOR-BASED DIGITAL ELECTRONIC THERMOCONTROLLER



1.1 - GENERAL DESCRIPTION

TLZ 11 is a digital microprocessor based thermocontroller for Heating or Cooling applications and ON/OFF control mode.

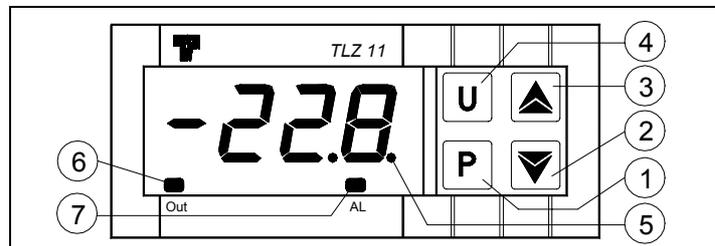
The instrument has up to 2 relay outputs, one input for PTC or NTC temperature probes and a digital input, that can be configured.

The 2 outputs can be used for controlling the temperature control device (OUT) and an alarm (AL).

The instrument is equipped with 4 programme keys, a 4-digit display and 2 LED signals, in addition to an internal buzzer that is the sound system for alarms.

Other important characteristics of the instrument are: programme parameters protection using personalised password, switching on and off (stand-by) of the instrument using the "U" front key, configuration of parameters via the KEY 01 device and the possibility of power supply in the range 100 ... 240 VAC.

1.2 - FRONT PANEL DESCRIPTION



1 - Key P : Used for setting the Set point and for programming the function parameters

2 - Key DOWN : Used for decreasing the values to be set and for selecting the parameters.

3 - Key UP : Used for increasing the value to be set and for selecting the parameters.

4 - Key U : It can be programmed via the parameter "USrb" to turning on and off (stand-by) the device. In the "hidden" parameter programming mode it's used to modify the visibility of the parameters (see par. 2.4).

5 - Led SET : Indicates the input in programming mode and the programming level of the parameters. It also serves to indicate the Stand-by status.

6 - Led OUT : Indicates the control output status (or the temperature control device) on (on), off (off) or inhibited (flashing).

7 - Led AL : Indicates the alarm status (on), off (off) and silenced (flashing)

THIS ITEM IS FULLY SET-UP BY IWM

NO FURTHER ADJUSTMENT IS REQUIRED

SECTION TWO: OPERATING THE MACHINE



PREPARATION FOR OPERATION

This information is supplied for recommended use only. Customers are obviously responsible for their operator's health and safety and their own site rules may vary from the detail below

1. At all times, gloves, aprons and ear defenders (where noise levels exceed safety limits) should be used when operating machines. Eye and body protection must be worn when handling chemicals and cleaning filters.
2. Ensure machine has been cleaned down in accordance with this manual.
3. Check that all tank drain valves are closed
4. Fill tanks with clean water.
5. Check detergent/sanitiser feed containers and replace if level is low.
6. Any water heating should then be activated and water allowed to reach operating temperature. Please refer to the following section for temperature control set-up and adjustment.
7. At this point any extraction fan may be activated to reduce steam build up.
8. Water inlet valves should be left on throughout operation, along with applicable heating medium supplies, if applicable.
9. Check that all filters and lids are in place, and that all doors are closed.

Figure 1: Typical Control Panel



10. Machine operation should then be initiated from main control panel.

OPERATION

Only items that were provided as samples or detailed within the agreed specification should be washed with this machine. Failure to comply will result in damage being caused to machine.

1. For manually operated systems, items should be loaded into equipment carefully, and in the correct manner.
2. To prolong the time between clean downs, ideally items should be free from loose / bulk debris before presenting to machine.
3. Items should be presented in accordance with machine design specification.
4. Items are as specified in machine order confirmation sheet. Forcing larger or alternate items into machine will result in internal jams and serious damage to internal apparatus.
5. During operation, it may be necessary to periodically clean filters. These should be removed from machine one at a time, hosed down and replaced before removing next filter. Filters should not be banged or kicked under any circumstances. Please see photographs for removal procedure.

Figure 2: Typical Tank Access



Figure 3: Typical Horizontal Filter Removal



6. Under no circumstances should top access lids or panels be opened or removed when machine is in operation.
7. In the event of a 'jam' in the machine, the machine should be stopped immediately and the engineering department notified to ascertain cause.
8. Under no circumstances should operators enter the machine to try to remove 'jammed' containers.
9. After use the equipment should be isolated and cleaned down in accordance with this manual. **Do Not** use emergency stop buttons to stop machine, always isolate at panel.
10. IWM recommend that machines be incorporated into site risk assessments, electrical testing schedules and method statements to suit operations, and all operators are fully trained to use and clean equipment.

Figure 4: Typical Emergency Stop Button



FINISHING OPERATI ON

1. When finishing operations, first ensure that machine is clear of all items previously inserted.
2. Machine should then be isolated from mains at main control panel.
3. After isolation of all electrical components, tanks should be drained and drain valves left open.

Figure 5: Internal Tank Sluice

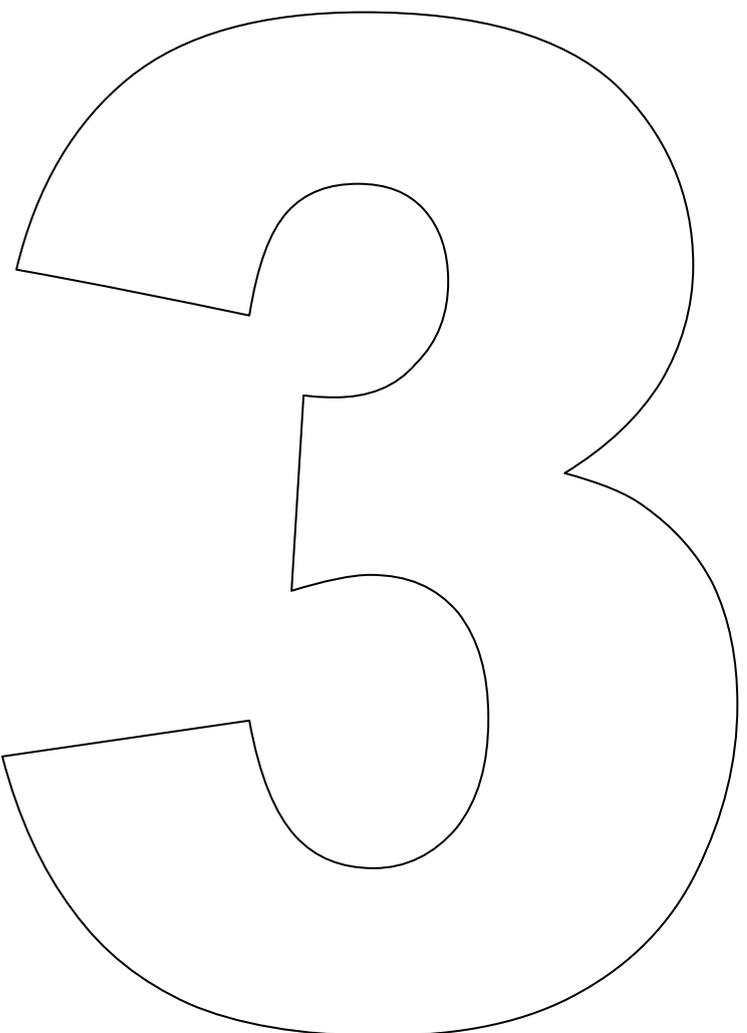


Figure 6: Typical Drain Valve



4. The equipment should then be thoroughly cleaned down, washing all debris into tanks and then to drain.
5. Drain valves should be closed and tanks should then be re-filled with water.
6. To prevent accidental damage the equipment should never be left empty.
7. All operators, cleaners and maintenance personnel involved with machine should be aware of and adhere to all safety matters and cleaning / maintenance schedules enclosed in this manual.
8. During clean down, operators should visually inspect equipment and any discrepancies with integrity of safety system or machine should be notified to site engineering dept or alternatively contact IWM for service or spares.

SECTION THREE: CLEANING THE MACHINE



CLEANING ROUTINES

To maintain performance of this machine, these routines must be strictly adhered to

Please be aware that any water damage to electrical and mechanical components is not covered under guarantee. Whilst IWM endeavour to protect against ingress of water, operators should take extreme care when cleaning machine that these components are kept dry

Daily Schedule

1. Turn off machine, and isolate at control panel.
2. Turn off water supply to machine and open drain valve(s).
3. Remove lids and filters from machine, and whilst waiting for tank to drain, hose down filters.
4. Hose down the inside of machine from top to bottom, washing all debris into tank and away to drain. Extra care should be taken whilst washing down air knife sections
5. Replace lids and filters.
6. Close drain valves and re-fill with fresh water.

Weekly Schedule

1. Carry out cleaning routine as per daily schedule.
2. Clean out blocked or partially blocked nozzles.
3. Flush pipe and manifolds by removing jet pipe end caps and running clean water via pump.

Figure 7: Jetpipe Endcap Arrangement.



Monthly Schedule

1. Carry out the above cleaning process
2. If in a hard water area, it may be necessary to de-scale the equipment utilising a suitable chemical. Consult IWM or your local chemical supplier for advice if required.

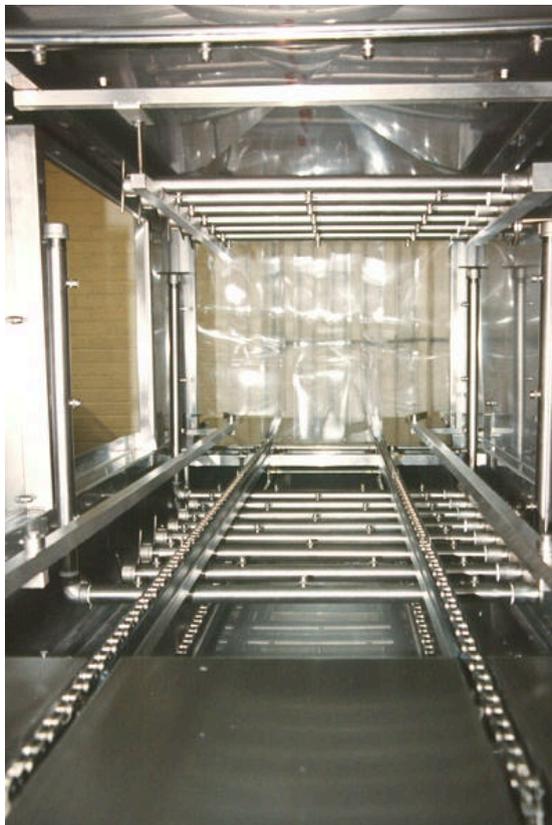
Bi-Annually

Contact IWM for machine servicing, if not already within a regular service contract agreement. IWM strongly advise a service contract be taken out to ensure maximum efficiency.

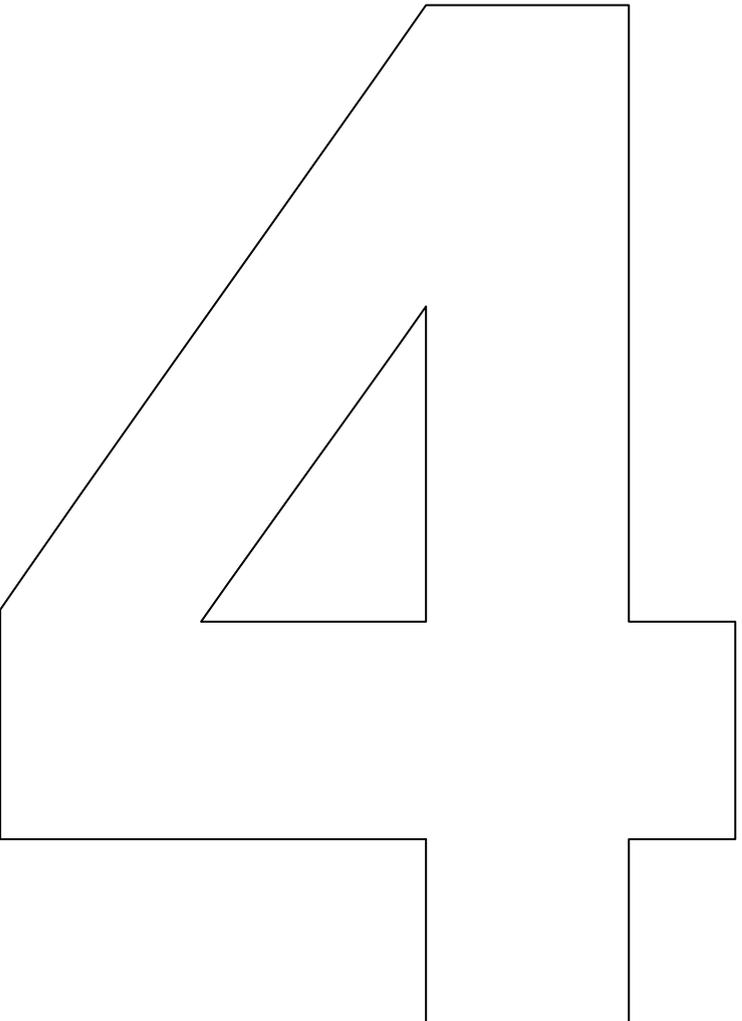
External Cleaning

1. The outside of the machine can be cleaned using low-pressure hose, being careful not to soak electrical gear or mechanical components.
2. Any dryer section should be hosed with the blowers running to prevent ingress of water.
 - *Always make sure the machine and the surrounding area is kept in a well-maintained, clean condition.*
 - *Never leave water tank empty, this will help prevent accidental damage.*

Figure 8: Internal Jetpipe Array.



SECTION FOUR: MAINTAINING MACHINE PERFORMANCE



MAINTENANCE OVERVIEW

Any maintenance should be carried out whilst the machine is isolated by trained and qualified engineers only. If in doubt contact IWM Service Department on:

0121 459 9511 or 0121 451 2788

1. Periodically, it may be necessary to de-scale the inside of the equipment. A solution of a suitable acid de-scalent may be added to the tank and re-circulated using the pump, (for very hard water areas water softening apparatus may be necessary). Ensure that the equipment is rinsed after this routine.
2. When it is found necessary to remove the nozzles and jet pipes for cleaning. This must be done by a competent person to ensure that they are put back in the correct position and fully tightened.
3. Every week check that all safety devices are functioning correctly., i.e. E-Stops, low level alarms, float switches, pull cords etc.
4. The chain running through the machine (if fitted) should at no time be allowed to run slack, the chain must be checked and adjustment made. Adjustment is quick and easy, using the adjustable bearings at the load end of machine.

Figure 9: Standard Adjustable Bearing (cover removed)



5. High-pressure hoses and such equipment should be avoided where possible, direct spraying of motors and electrical components can cause damage.
6. If engineers need to carry out repair work inside the machine, crawling boards must be used to prevent accidents.
7. Under no circumstances should electrical power tools be used inside the machine until the water tanks have been drained completely and the water service to the machine isolated.

All faults with equipment should be notified to IWM in writing, giving a full detail of events leading up to, and the current symptoms of the fault. Preferably the machine should be registered and have an ongoing service contract with IWM.

MAINTENANCE MATRIX

JOB	Weekly	Monthly	Annually
			IWM Service Visit
JET SYSTEM			
NOZZLES IN PLACE	x		x
CORRECT ALIGNMENT		x	x
CORRECT NOZZLES		x	x
NOZZLES UNBLOCKED	x		x
PIPES CLEAR OF DEBRIS	x		x
MANIFOLDS CLEAR	x		x
SHAFT/BEARING ASSEMBLY			
INSPECT BEARINGS:		x	x
LUBRICATE		x	x
REPLACE			x
CLEAN COVERS			x
INSPECT SHAFTS	x		x
CHECK SPEED		x	x
RUN AND TEST	x		x
ELECTRICAL			
CHECK MOTOR LOADS	x		x
CHECK MOTOR OPERATIONS		x	x
DIRECTIONS			x
CHECK SAFETY CIRCUITS	x		x
CHECK LEVEL SWITCHES	x		x
INSPECT CONTROL PANEL		x	x
CHECK/SET DIGITAL DISPLAYS		x	x
CHECK LIMIT SWITCHES/PEC'S	x		x
HEATING			
CHECK HEATING SYSTEMS		x	x
SET THERMOSTATS		x	x
GENERAL			
CHECK M/C FIXINGS	x		x
CHECK FILTERS	x		x
TEST			
CHECK M/C DUTY			x
CHECK M/C PERFORMANCE		x	x
CHECK M/C THROUGHPUT		x	x

IWM TROUBLESHOOTING GUIDE

IWM are pleased to answer any enquiry regarding the operation of their machinery, and service personnel are available should the need arise. Short training tutorials for operating staff are also available if required. In the unlikely event of the machine not performing to specification, the following guide should enable competent personnel to answer the most frequently asked questions regarding machine.

General

Tanks do not fill

1. Check that all mains fill valves are open.
2. Check that solenoid valves are opening correctly.
3. Check that tank level switches are clear of debris and operating correctly.
4. Check that all tank drain valves are closed, and vertical overflow tubes (if present) are fully located in overflow sockets.

Machine does not start

1. Is continuous electrical supply to machine present, and of correct voltage and current?
2. Is control panel door closed correctly and isolator/door latch in 'on' position?
3. Are all emergency stops reset? If not reset stops and then re-activate components from push buttons on control panel.
4. Are all access doors closed and faces of magnetic interlocks mating correctly? If not close doors correctly and then re-activate components from push buttons on control panel.
5. Are all guard doors closed? If not close doors correctly and then re-activate components from push buttons on control panel.

Pump(s)

Pump does not start

1. Is pump switch on panel on?
2. Has pump motor been drenched externally with water? Allow motor to dry naturally and avoid hosing near pump in future.
3. Are tanks full of water? Low level protection (where fitted) will de-activate pump if level is low
4. Has circuit breaker in panel tripped? Check and reset breaker. This is indicative of pump drawing too much current under load when operated under adverse conditions such as missing jet nozzles or pipework. Monitor this carefully and inform IWM immediately if panel is tripping out excessively.
5. Is tank clean and pump inlet free from debris, pump will trip circuit breaker if load is excessive. If debris is present, clean tank, filters and pump inlet with low-pressure hoses. Wash all debris to drain. Re-fill tanks with clean water and re-start.
6. Is tank and pump free from excessive lime scale build-up, pump will trip circuit breaker if load is excessive. If scale appears considerable, add suitable acid

de-scalent to tank and allow to dissolve scale before thoroughly rinsing all acid to drain. Re-fill tanks with clean water and re-start.

Pump labours under load

1. Check pump inlet is free from debris.
2. Check that nozzles are not blocked by observing spray pattern. If nozzles are not jetting correctly, isolate machine from supply and perform jet pipe and nozzle clearing procedure as detailed in cleaning routine.
3. Pump seals are worn, contact IWM for replacement seal set.
4. Check water level. Is water level on far side of filters higher than on pump side? If so mesh filters are blocked. Remove filter screens and clean thoroughly (for vertical filters only)

The following sections will be specific to each machine. Any combination of these heating mediums may be fitted to individual tanks or to water inlets. Please refer to connection details and machine specific operation section. If unsure of the specific heating method, contact IWM, quoting machine serial number from CE plate attached to machine canopy.

Electrical heating

1. Is heater switch on panel switched to the 'on' position?
2. Are tanks full of water, low level protection will de-activate heaters if level is low.
3. Has circuit breaker in panel tripped, check and reset. This is indicative of elements drawing too much current under load when heaters are being operated under adverse conditions such as heavy soiling around elements. Monitor this carefully and inform IWM immediately if panel is tripping out excessively.
4. Is tank clean and elements free from debris, elements will trip circuit breaker if load is excessive. If debris is present, clean tank and elements with low pressure hoses. Wash all debris to drain. Re-fill tanks with clean water and re-start.
5. Are elements free from excessive lime scale build-up, elements will trip circuit breaker if load is excessive. If scale appears considerable, add suitable acid de-scalent to tank and allow to dissolve scale before thoroughly rinsing all acid to drain. Re-fill tanks with clean water and re-start.
6. Is digital heating control set too low? Follow digital temperature control set-up procedure enclosed. Be aware that adjusting control too high will shorten element life, and draw more current.
7. If control panel trips out continuously, and elements have been isolated as causing the trip, one or more of the elements has burnt out. Contact IWM for a replacement.

Steam heating

1. Check that steam supply is present to machine and all supply valves are open.
2. Check that supply is being maintained at a constant pressure, approx 70 psi and sufficient flow rate is available.
3. Is digital heating control set too low? Follow digital temperature control set-up procedure enclosed.
4. Check that solenoid valve is operating correctly, where fitted.
5. Check all steam pipe work to and from machine for leaks.
6. Open in-line strainer valves (if fitted), to remove possible build-ups of water in steam pipe work.

Figure 10: Standard Solenoid Steam Inlet and Condensate Return (Plate Coil Only)



If fitted with steam injectors

1. Check that impurities in steam line are not fouling steam injector plates.
2. Check that steam injector plates are not coated in fat, sugar or scale residue and impeding steam flow through plates.

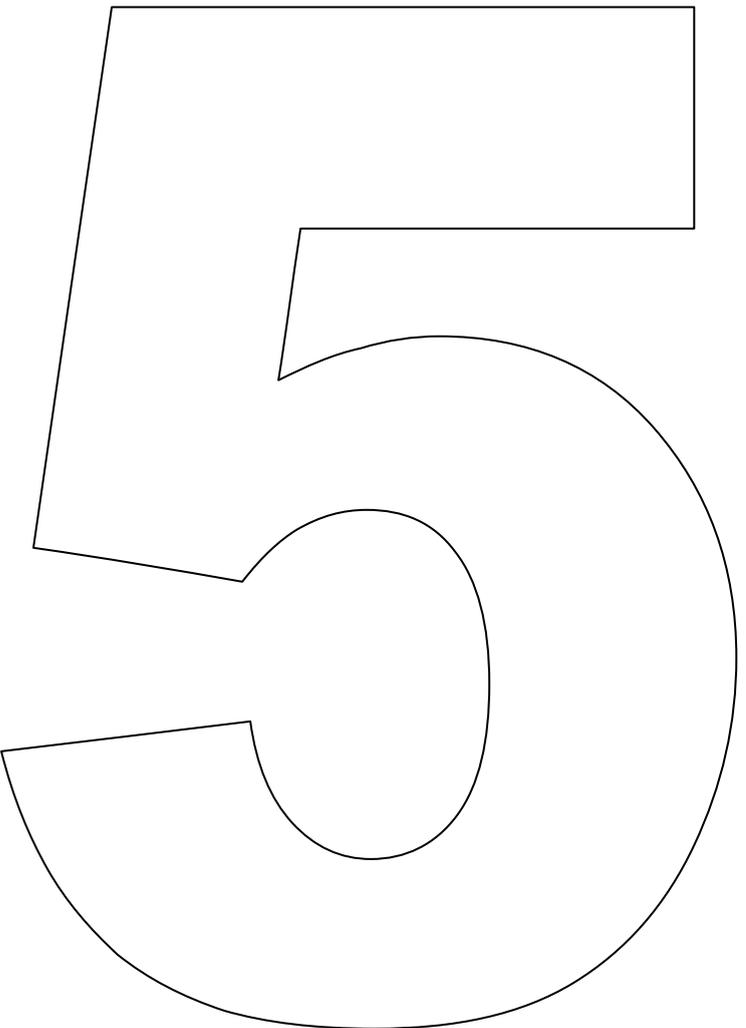
If fitted with steam plate coils

1. Check that condensate return is correctly returning condensate to steam generation plant. Excessive distances of return pipe work or varying levels between machine and steam generation may warrant the use of condensate return pumping. This is to be determined by customer's on-site personnel or external contractors.
2. Check that plate coil has not become clogged from debris from old pipe work, if necessary disconnect coil from steam line and flush with water.

Gas heating

1. Is burner switch on control panel in the 'on' position?
2. Check gas supply to burner
3. Are all components kept in a dry condition? If water enters burner solenoid, circuit will short and burner will be rendered in-operative. It is vitally important that the burner is kept well away from the use of high pressure hosing equipment.
4. Refer to burner manufacturer's manual supplied for burner model specific trouble shooting instructions.

SECTION FIVE: ADDITIONAL MACHINE DETAILS



ROTARY FILTER UNIT *(Optional)*

Before cleaning wash tank, due to the nature of the mechanical moving filter bed, machine should be isolated at main control panel.

Filter lid is protected by magnetic interlock, and will cut power if lid is lifted while machine is running.

Moving filter bed is designed to be a self contained removable unit. When access to wash tank is required, gearbox should be un-plugged and then entire unit can be lifted free clear from tank.

It should be noted that two members of personnel will be required for this task.

For safety reasons removal of filter bed should not under any circumstances be attempted by a single operative.

Once filter bed has been removed, tank can be fully cleaned down, washing all waste to drain.

Filter can then be returned to its position on wash tank, reconnected to power supply and covered with lid.

Figure 10: Typical Rotary Filter



PIT MOUNTED MACHINES

Open Pit Mounted

Care should be exercised when hosing around machinery. The hosing of floor debris into machine pit should be avoided, as it can lead to a build up of debris beneath the machine, which is extremely difficult to remove. Where applicable, all cover plates should be in place before any local hose cleaning takes place, as this will help to keep machine pit clear.

Care should also be taken when discharging tanks to drain. Flow rate should be monitored to avoid pit flooding due to drain blockages.

Sealed Pit Mounted

Care should be taken when discharging tanks to drain. Flow rate should be monitored to avoid tank dry zone flooding due to drain blockages.

Figure 11: Typical Cabinet Machine (Sealed Pit Model)



NEVER

Walk into machine unless authorised to do so, at which time full electrical isolation and safety precautions should be undertaken.

POWERED LOADING DEVICES

At any time, any working operator should be fully trained in the specific use and safety guidelines relevant to any powered equipment.

Lifting Devices

Lifting devices are fitted with “dead mans switch” safety controls. In the event of incident, the lifting device will automatically stop if operator removes his hands from push button controls during operation.

Never activate a lifting device until lifting area is clear of personnel, or potential obstructions, and it is totally safe to do so.

NEVER attempt to use an lifting device for any other purpose, or to lift any item that is not detailed in machine operational specification.

Figure 12: Typical Lifting Device



Powered Infeed/Outfeed Ramps

Most driven infeed and outfeed ramps are designed to operate continuously while machine is operating. Items are to be loaded and unloaded from ramp ends only, operators should not reach or stretch over sides of powered ramps during operation for any purposes.

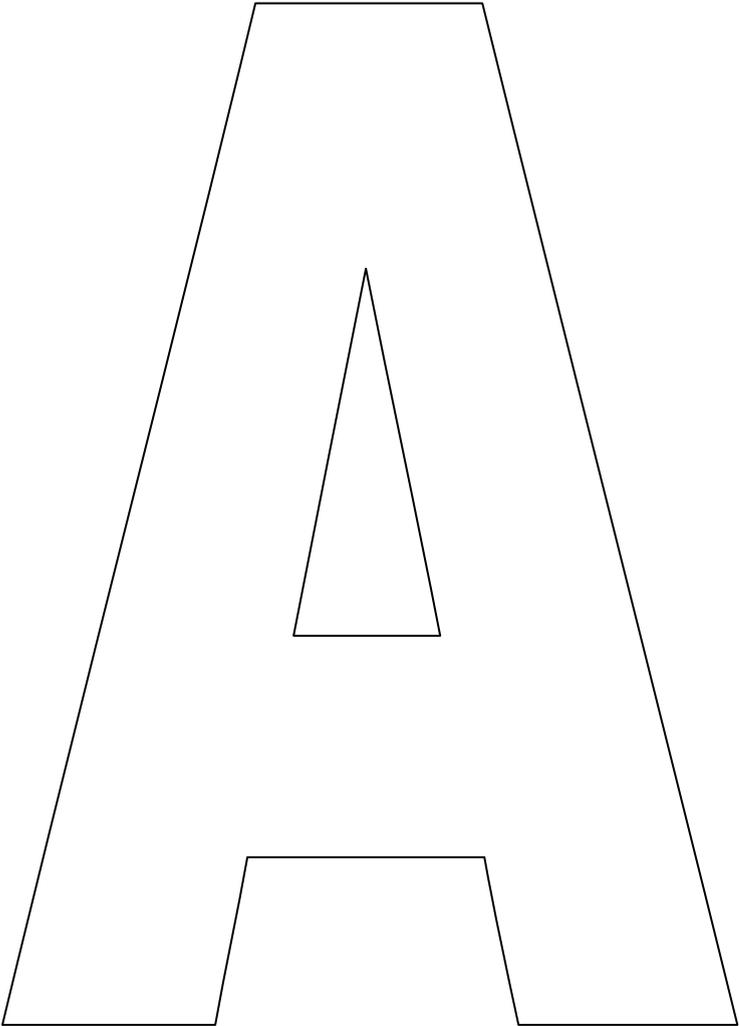
Some driven pallet loading ramps are designed to be operated by “dead mans switch” safety controls. In the event of incident, the lifting device will automatically stop if operator removes his hands from push button controls during operation.

Powered Doors

Powered doors on fully automatic systems will operate and will close as soon as lifting device has loaded items into machine.

Personnel should remain outside of machine cage guard areas at all times during operation.

APPENDICES SECTION





TLZ 11

MICROPROCESSOR-BASED DIGITAL ELECTRONIC THERMOCONTROLLER



OPERATING INSTRUCTIONS Vr. 01 (ENG) - cod.: ISTR 06456

FOREWORD

This manual contains the information necessary for the product to be installed correctly and also instructions for its maintenance and use; we therefore recommend that the utmost attention is paid to the following instructions.

Though this manual has been issued with the greatest care, TECNOLOGIC S.p.A. will not take any responsibility deriving from its use.

The same applies to each person or Company involved in the issuing of this manual.

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1 - INSTRUMENT DESCRIPTION

1.1 - GENERAL DESCRIPTION

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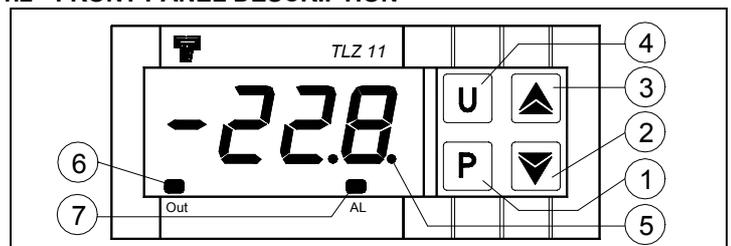
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Other important characteristics of the instrument are: programme parameters protection using personalised password, switching on and off (stand-by) of the instrument using the "U" front key, configuration of parameters via the KEY 01 device and the possibility of power supply in the range 100 ... 240 VAC.

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6 - Led OUT : Indicates the control output status (or the temperature control device) on (on), off (off) or inhibited (flashing).

7 - Led AL : Indicates the alarm status (on), off (off) and silenced (flashing)

2 - PROGRAMMING

2.1 - PROGRAMMING OF THE SET POINT

Press the key **P** then release it and the display will show **SP** alternating with the set value.

To change it press the UP key to increase the value or DOWN to decrease it.

These keys increase or decrease the value one digit at a time, but if the button is pressed for more than one second the value increase or decreases rapidly, and after two seconds pressed, the speed increases even more to all the desired value to be reached rapidly.

Exiting the Set mode is achieved by pressing the P key or automatically if no key is pressed for 15 seconds. After that time the display returns to the normal function mode.

2.2 - PARAMETERS PROGRAMMING

To access the instrument's function parameters, press the key **P** and keep it pressed for about 5 seconds, after which the SET led will light up, the display will visualised the code that identifies the first parameter.

Using the UP and DOWN keys, the desired parameter can be selected and pressing the P key, the display will alternately show the parameter code and its setting that can be changed with the UP and DOWN keys.

Once the desired value has been set, press the key P again: the new value will be memorised and the display will show only the code of the selected parameter.

Pressing the UP and DOWN keys, it is possible to select another parameter and change it as described.

To exit the programming mode, do not press any key for about 20 seconds, or keep the UP or DOWN key pressed until it exits the programming mode.

2.3 - PARAMETER PROTECTION USING THE PASSWORD

The instrument has a parameter protection function using a password that can be personalised, through the "PASS" parameter.

If one wishes to have this protection, set the password number desired in the parameter "PASS".

When the protection is working, press the P key to access the parameters and keep it press for about 5 seconds, after which the LED SET will flash and the display will show "0" .

At this point, using the UP and DOWN keys, set the password number programmed and press the key "P".

If the password is correct, the display will visualise the code that identifies the first parameter and it will be possible to programme the instrument in the same ways described in the previous section.

Protection using a password can be disabled by setting the parameter "PASS" = OFF.

2.4 - PARAMETERS PROGRAMMING LEVELS

The instrument has two parameter programming levels.

The first level ("visible" parameters) is accessed according to the procedure described above (with or without password request) while the second level ("hidden" password) can be accessed according to the following procedure.

Remove the power supply to the instrument, press the key P and return power to the instrument, keeping the key pressed.

After about 5 sec. the SET led will light up, the display will show the code that identifies the first parameter and it will be possible to set the parameters of the instrument using the same programming procedure described previously.

Once the parameter has been selected and the SET is on, it means that the parameter can be programmed even on the first level ("visible").

If the LED is off it means that the parameter can only be programmed on this level (i.e. "hidden").

To change the visibility of the parameter, press the key U: the led SET will change status, indicating the accessibility level of the parameter (on = parameter "visible"; off = parameter "hidden").

The access procedure for "hidden" parameters allows the "PASS" parameter to be checked and changed, and is useful therefore if the password set has been forgotten.

2.5 - ON / STAND-BY FUNCTION

The instrument, once powered up, can assume 2 different conditions:

- ON : means that the controller uses the control functions.

- STAND-BY : means that the controller does not use any control function and the display is turned off except for the green SET led.

If there is no power, and then power returns, the system always sets itself in the condition it was in before the black-out.

The ON/Stand-by function can be selected using the key U if the parameter "USrb" = 1 (see par. 4.6)

3 - INFORMATION ON INSTALLATION AND USE



3.1 - PERMITTED USE

The instrument has been projected and manufactured as a measuring and control device to be used according to EN61010-1 for the altitudes operation until 2000 ms. The use of the instrument for applications not expressly permitted by the above mentioned rule must adopt all the necessary protective measures. The instrument CANNOT be used in dangerous environments (flammable or explosive) without adequate protection. The installer must ensure that EMC rules are respected, also after the instrument installation, if necessary using proper filters. Whenever a failure or a malfunction of the device may cause dangerous situations for persons, thing or animals, please remember that the plant has to be equipped with additional devices which will guarantee safety.

3.2 - MECHANICAL MOUNTING

The instrument, in case 33 x 75 mm, is designed for flush-in panel mounting. Make a hole 29 x 71 mm and insert the instrument, fixing it with the provided special bracket. We recommend that the gasket is mounted in order to obtain the front protection degree as declared. Avoid placing the instrument in environments with very high humidity levels or dirt that may create condensation or introduction of conductive substances into the instrument. Ensure adequate ventilation to the instrument and avoid installation in containers that house devices which may overheat or which may cause the instrument to function at a higher temperature than the one permitted and declared. Connect the instrument as far away as possible from sources of electromagnetic disturbances such as motors, power relays, relays, solenoid valves, etc.

3.3 - ELECTRICAL CONNECTION

Carry out the electrical wiring by connecting only one wire to each terminal, according to the following diagram, checking that the power supply is the same as that indicated on the instrument and that the load current absorption is no higher than the maximum electricity current permitted.

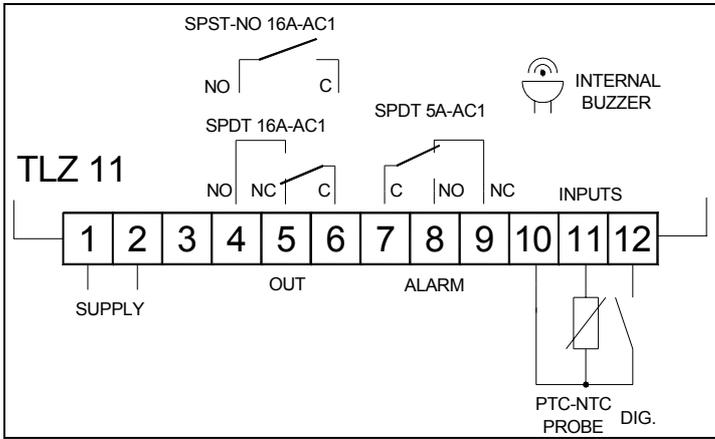
As the instrument is built-in equipment with permanent connection inside housing, it is not equipped with either switches or internal devices to protect against overload of current: the installation will include an overload protection and a two-phase circuit-breaker, placed as near as possible to the instrument, and located in a position that can easily be reached by the user and marked as instrument disconnecting device which interrupts the power supply to the equipment.

It is also recommended that the supply of all the electrical circuits connected to the instrument must be protected properly, using devices (ex. fuses) proportionate to the circulating currents. It is strongly recommended that cables with proper insulation, according to the working voltages and temperatures, be used. Furthermore, the input cable of the probe has to be kept separate from line voltage wiring. If the input cable of the probe is screened, it has to be connected to the ground with only one side. Whether the instrument is 12 V version it's recommended to use an external transformer TCTR, or with equivalent features, and to use only one transformer for each instrument because there is no insulation between supply and input.

We recommend that a check should be made that the parameters are those desired and that the application functions correctly before connecting the outputs to the actuators so as to avoid malfunctioning that may cause irregularities in the plant that could cause damage to people, things or animals.

Tecnologic S.p.A. and its legal representatives do not assume any responsibility for any damage to people, things or animals deriving from violation, wrong or improper use or in any case not in compliance with the instrument's features.

3.4 - ELECTRICAL WIRING DIAGRAM



4 - FUNCTIONS

4.1 - MEASURING AND VISUALIZATION

Via the parameter "SEnS" it is possible to select the type of probes that one wishes to use and which can be: thermistors PTC KTY81-121 (Ptc) or NTC 103AT-2 (ntc).

Once the type of probe used has been selected, through the parameter "Unit", it is possible to select the temperature unit of measurement (°C or °F) and, through the parameter "dP", the resolution of the desired measurement (OFF=1°; On =0,1°).

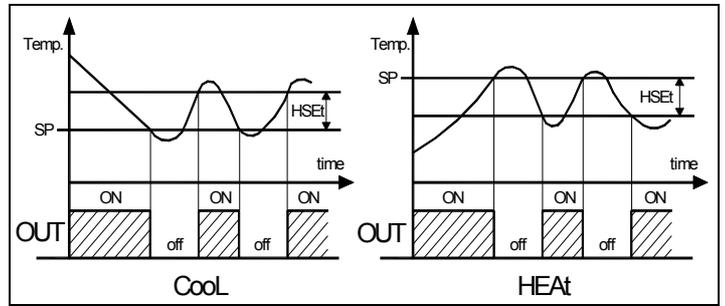
The instrument allows the measuring to be calibrated, that can be used for re-calibrating the instrument according to application needs, through the parameters "OFS".

Using the parameter "FIL", it is possible to set the time constant for the software filter for measuring the input values to be able to reduce the sensitivity to measurement disturbances (increasing the time).

4.2 - TEMPERATURE CONTROL

The regulation of the instrument is ON/OFF and acts on the output "OUT" depending on the measuring of probe, of the Set Point "SP", the intervention differential "HSEt" and the function mode "Func".

Depending on the function mode programmed on the parameter "Func" the differential is automatically considered by the regulator with positive values for a Refrigeration control ("Func"=Cool) or with negative values for a heating control ("Func"=HEAT).



In the event of probe error, it is possible to set the instrument so that the output "OUT" continues to work in cycles according to the times programmed in the parameter "tonE" (activation time) and "toFE" (deactivation time).

If an error occurs on the probe the instrument activates the output for the time "tonE", then deactivates it for the time "toFE" and so on whilst the error remains.

Programming "tonE" = OFF the output in probe error condition will remain switched off.

Programming instead "tonE" to any value and "toFE" = OFF the output in probe error condition will remain switched on.

Remember that the temperature regulation function can be conditioned by the "Compressor Protection" function described below.

4.3 - COMPRESSOR PROTECTION FUNCTION AND DELAY AT POWER-ON

The function "Compressor Protection" carried out by the machine aims to avoid close start ups of the compressor controlled by the instrument in cooling applications.

This function foresees a time control on the switching on of the "OUT" output associated with the temperature regulation request.

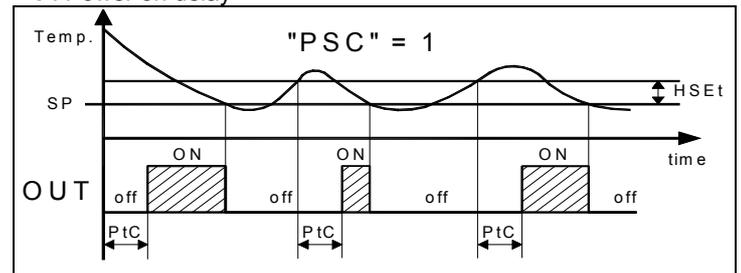
The protection consists of preventing the output being switched on during the time set in the parameter "PtC" and counted depending on what has been programmed in the parameter "PSC", and therefore that any activation occurs only after the "PtC" time has finished.

If during the power on delay phase, the regulator request should disappear, due to an inhibition caused by the compressor protection function, the foreseen start up of the output is naturally cancelled.

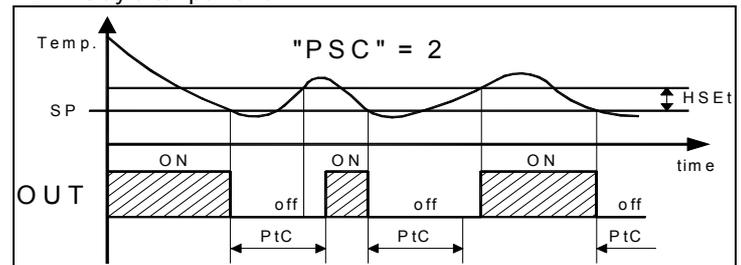
Using the parameter "PSC", it is possible to set the type of compressor protection and therefore from when the inhibition time "PtC" must start.

The parameter "PSC" can be set as:

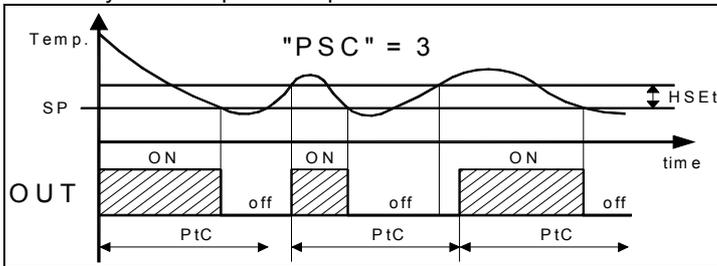
= 1 : Power on delay



= 2 : Delay after power off



= 3 : Delay between power on phases.



The function is disabled by programming "PtC" = 0. During the power on delay phases of the OUT output by inhibiting the function "Compressor Protection" the led OUT flashes. It is also possible to prevent activation of the output after the instrument is turned on, for the time set in the parameter "od". The function is disabled by "od" = OFF. During the power on delay phase, the display shows the indication od, alternating with the normal programmed visualisation.

4.4 - ALARM FUNCTIONS

The alarm functions of the instrument work on the led AL, on the internal buzzer (if present) and on the output AL (if present). The buzzer are activated in alarm conditions and can be disabled (alarm silencing) manually by pressing any key of the instrument. Any active alarm is shown on the instrument display with the lighting up of the AL led. Any silenced alarm status is shown by the AL led flashing. The output AL are activated in alarm status but cannot be disabled manually and are therefore only disabled when the alarm status ceases.

The alarm conditions of the instrument are:

- Probe errors "E1", "-E1"
- temperature alarms "HI" and "LO"
- External alarms "AL"

4.4.1 - TEMPERATURE ALARMS

The temperature alarms, that are relative type, work according to the probe measurement, the alarm thresholds set in parameters "HAL" (maximum alarm) and "LAL" (minimum alarm) and the relative differential "dAL".

Using some parameters it is also possible to delay the enablement and the intervention of these alarms.

These parameters are:

"PAL" - is the temperature alarm exclusion time on switching on the instrument if the instrument is in alarm status when it is switched on.

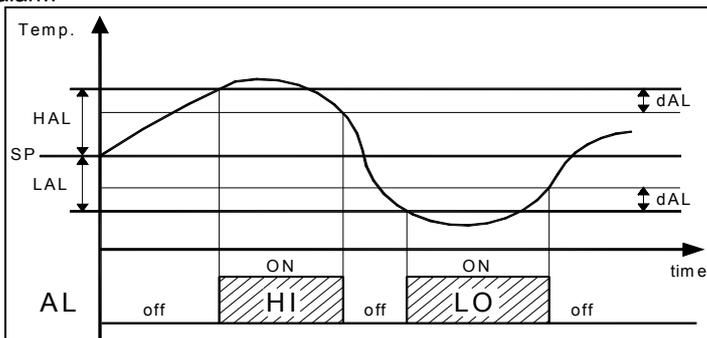
"ALd" - is the temperature alarm delay activation time

The temperature alarm is enabled at the end of exclusion time and is enabled after the "ALd" time when the temperature measured by the probe exceeds the value ["SP"+"HAL"] or or goes below the value ["SP"-LAL"].

The maximum and minimum temperature alarms can be disabled by setting the relative parameters "HAL" and "LAL" = OFF.

At the same time as the signalling of the alarm device (buzzer and output AL), the instrument signals the alarm by turning on the led light AL, and visualises on the display:

- Alternately **HI** and the measured temperature for maximum alarm
- Alternately **LO** and the measured temperature for the minimum alarm



4.4.2 - EXTERNAL ALARM

The instrument can signal an external alarm by activating the digital input with the function programmed as "diF" = 3 (see par. 4.5). At the same time as the signalling of the alarm (buzzer and/or output), the instrument signals the alarm by turning on the led AL and visualising **AL** and the measured temperature alternately on the display.

4.5 - DIGITAL INPUT

The digital input present on the instrument accepts contacts free of voltage, the function carried out is defined by the parameter "diF".

The parameter "diF" can be configured for the following functions:

- = 0, = 1, = 2, = -1, = -2 - Digital input not active
- = 3 - External alarm signal with contact normally open: on closing the input the alarm is activated and the instrument visualises **AL** and the measured temperature alternately on the display.
- = -3 - External alarm signal with contact normally closed : similar to "diF"=3 but with function logic reversed.

4.6 - FUNCTIONING OF KEY "U"

The U key function can be defined by the parameter "USrb" and can be configured for the following functions:

- = OFF - The key U carries out no function.
- = 1 - Pressing the key for at least 1 second, it is possible to switch the instrument from the ON status to Stand-by status and vice versa.

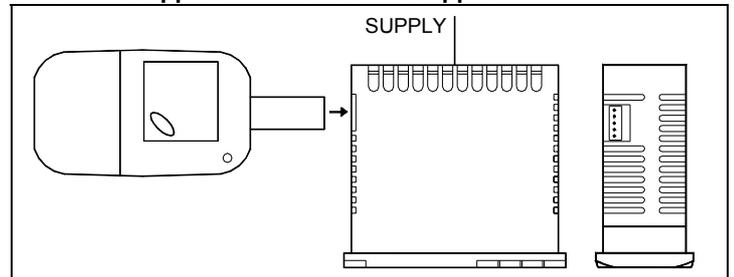
4.7 - PARAMETERS CONFIGURATION BY "KEY01"

The instrument is equipped with a connector that allows the transfer from and toward the instrument of the functioning parameters through the device **TECNOLOGIC KEY01** with **5 poles** connector.

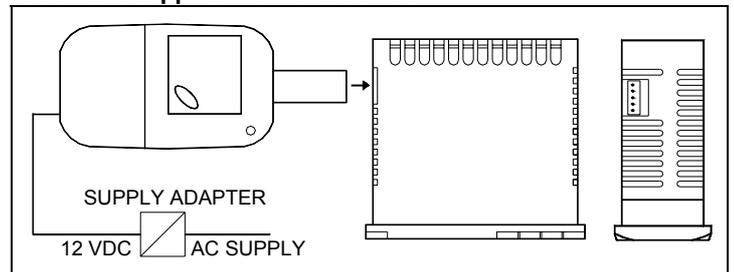
This device it's mainly useable for the serial programming of the instruments which need to have the same parameters configuration or to keep a copy of the programming of an instrument and allow its rapid retransmission.

To use the device KEY01 it's necessary that the device or instrument are being supplied.

Instrument supplied and device not supplied



Instrument supplied from the device



To transfer the configuration of an instrument into the device (**UP-LOAD**) it is necessary to proceed in the following way:

- 1) position both dip switch of KEY 01 in the **OFF** mode.
- 2) connect the device to the instrument TLZ plugging the special connector.
- 3) verify that the instrument or the device are supplied
- 4) observe the indication led on the device KEY 01: if it results green this means that a configuration is already loaded on the device while if it results green blinking or red blinking this means that it has not been loaded any valid configuration on the device.
- 5) press the button placed on the device.

6) observe the indication led : after having pressed the button, the led becomes red and therefore, at the end of the data transfer, it becomes green.

7) now it is possible to disconnect the device.

To transfer the configuration loaded on the device onto an instrument of the same family (**DOWNLOAD**), it is necessary to proceed in the following way:

1) position both dip switch of KEY 01 in the **ON** mode.

2) connect the device to an instrument TLz having the same features of the one from which has been downloaded the desired configuration, plugging the special connector.

3) verify that the instrument or the device are supplied

4) observe the indication led on the device KEY 01: it has to result green, because if the led results green blinking or red blinking, this means that on the device it has not been downloaded any valid configuration and therefore it's useless to continue.

5) if the les results green, press the button placed on the device.

6) observe the indication led : after having pressed the button, the led becomes red and therefore, at the end of the data transfer, it becomes green.

7) now it is possible to disconnect the device.

For additional info, please have a look at the KEY01 instruction manual.

5 - PROGRAMMABLE PARAMETERS TABLE

Here below is a description of all the parameters available on the instrument. Some of them may not be present, either due to the fact they depend on the type of instrument or because they are automatically disabled as unnecessary.

Par.	Description	Range	Def.	Note
1	SPLL Minimum Set Point	-58.0 ÷ SPHL	-50.0	
2	SPHL Maximum Set Point	SPLL ÷ 302.0	100.0	
3	SEnS Probe Type	Ptc - ntc	Ptc	
4	OFS Probe Calibration	-30.0 ÷ 30.0 °C/°F	0.0	
5	Unit Unit of measurement	°C - °F	°C	
6	dP Decimal point	On - OFF	On	
7	FIL Measurement filter	OFF ÷ 20.0 sec	2.0	
8	HSEt Differential	0.0 ÷ 30.0 °C/°F	2.0	
9	tonE Activation time output OUT for probe broken	OFF ÷ 99.59 min.sec	OFF	
10	toFE Deactivation time output OUT for probe broken	OFF ÷ 99.59 min.sec	OFF	
11	Func Function mode output OUT	HEAt - Cool	Cool	
12	PSC Type of compressor protection: 1= delay at switch on 2= delay after switch off 3= delay between starts	1 - 2 - 3	1	
13	PtC Compressor protection time	OFF ÷ 99.59 min.sec	OFF	
14	od Delay at power on	OFF ÷ 99.59 min.sec	OFF	
15	HAL Relative High temperature Alarm threshold	OFF ÷ 100.0 °C/°F	OFF	
16	LAL Relative Low temperature Alarm threshold	OFF ÷ 100.0 °C/°F	OFF	
17	dAL Temperature Alarms Differential	0.0 ÷ 30.0 °C/°F	2.0	
18	ALd Temperature Alarms delay	OFF ÷ 99.59 min.sec	OFF	
19	PAL Temperature Alarms delay at power on	OFF ÷ 24.00 hrs.min	2.00	
20	USrb Function mode key U: OFF= No Function 1= ON/STAND-BY	OFF / 1	OFF	

21	diF	Function and function logic of digital input: 0, 1, 2 = No function 3= External alarm	-3 / -2 / -1 / 0 / 1 / 2 / 3	0	
22	PASS	Access Password to parameter functions	OFF ÷ 9999	OFF	
23	SP	Set Point	SPLL ÷ SPHL	0.0	

6 - PROBLEMS, MAINTENANCE AND GUARANTEE

6.1 - SIGNALLING

Error Signalling:

Error	Reason	Action
E1 -E1	The probe may be interrupted or in short circuit, or may measure a value outside the range allowed	Check the correct connection of the probe with the instrument and check the probe works correctly
EEPr	Internal memory error	Check and if necessary re-programme the parameters function.

In probe error status, the output OUT behaves as set by the parameters "tonE" and "toFE".

Other Signalling:

Message	Reason
od	Delay in switching on in progress
HI	Maximum temperature alarm in progress
LO	Minimum temperature alarm in progress
AL	Digital input alarm in progress

6.2 - CLEANING

We recommend cleaning of the instrument with a slightly wet cloth using water and not abrasive cleaners or solvents which may damage the instrument.

6.3 - GUARANTEE AND REPAIRS

The instrument is under warranty against manufacturing flaws or faulty material, that are found within 12 months from delivery date. The guarantee is limited to repairs or to the replacement of the instrument.

The eventual opening of the housing, the violation of the instrument or the improper use and installation of the product will bring about the immediate withdrawal of the warranty's effects.

In the event of a faulty instrument, either within the period of warranty, or further to its expiry, please contact our sales department to obtain authorisation for sending the instrument to our company. The faulty product must be shipped to TECNOLOGIC with a detailed description of the faults found, without any fees or charge for Tecnologic, except in the event of alternative agreements.

7 - TECHNICAL DATA

7.1 - ELECTRICAL DATA

Power supply: 12 VAC/VDC, 24 VAC/VDC, 100..240 VAC +/- 10%

Frequency AC: 50/60 Hz

Power consumption: 3 VA approx.

Input/s: 1 input for temperature probes: PTC (KTY 81-121, 990 Ω @ 25 °C) or NTC (103AT-2, 10KΩ @ 25 °C); 1 digital input for free voltage contacts

Output/s: up to 2 relay outputs: OUT SPST-NO (16A-AC1, 6A-AC3 250 VAC) or SPDT 16A-AC1, 6A-AC3 250 VAC) and AL SPST-NO (5A-AC1, 2A-AC3 250 VAC).

Electrical life for relay outputs: OUT SPST-NO: 100000 op. ; SPDT: 50000 op. (om. VDE); AL: 100000 op.

Installation category: II

Measurement category: I

Protection class against electric shock: Class II for Front panel

Insulation: Reinforced insulation between the low voltage part (supply H type and relay outputs) and front panel; Reinforced insulation between the low voltage section (supply type H and relay outputs) and the extra low voltage section (inputs); Reinforced

between supply and relay outputs; No insulation between supply F type and inputs.

7.2 - MECHANICAL DATA

Housing: Self-extinguishing plastic, UL 94 V0

Dimensions: 33 x 75 mm, depth 64 mm

Weight: 115 g approx.

Mounting: Flush in panel in 29 x 71 mm hole

Connections: 2,5 mm² screw terminals block

Degree of front panel protection : IP 65 mounted in panel with gasket

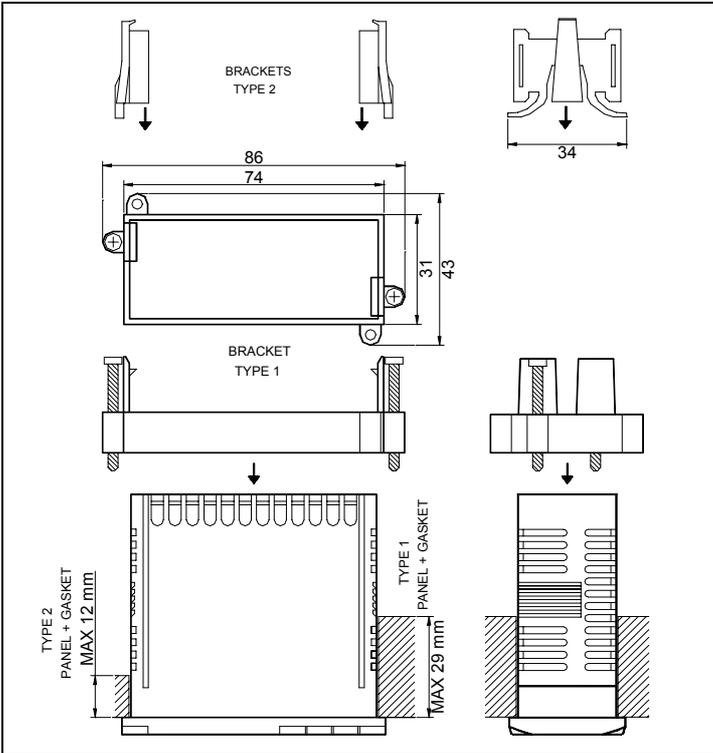
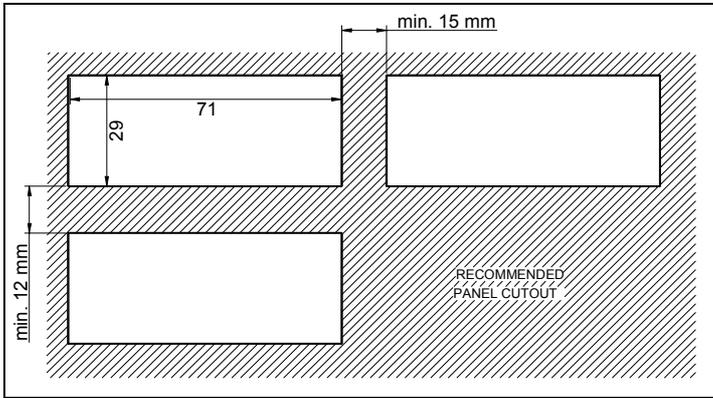
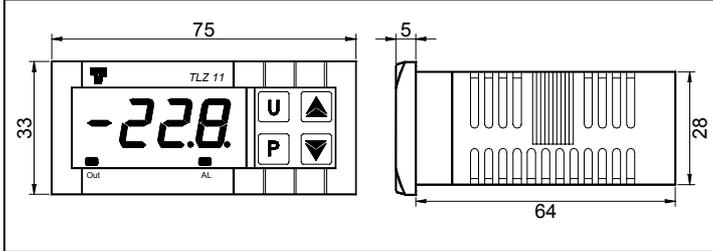
Pollution situation: 2

Operating temperature: 0 ... 50 °C

Operating humidity: 30 ... 95 RH% without condensation

Storage temperature: -10 ... +60 °C

7.3 - MECHANICAL DIMENSIONS, PANEL CUT-OUT AND MOUNTING [mm]



7.4 - FUNCTIONAL FEATURES

Temperature Control: ON/OFF mode

Measurement range: PTC: -50...150 °C / -58 ... 302 °F;

NTC: -50...109 °C / -58...228 °F

Display resolution: 1 ° or 0,1°

Overall accuracy: +/- 0,5 % fs

Sampling rate: 130 ms.

Display: 4 Digit Red h 12 mm

Compliance: ECC directive EMC 89/336 (EN 61326), ECC directive LV 73/23 and 93/68 (EN 61010-1)

7.5 - INSTRUMENT ORDERING CODE

TLZ 11 - a b c d ee

a : POWER SUPPLY

H = 100...240 VAC

L = 24 VAC/VDC

F = 12 VAC/VDC

b : OUTPUT OUT TYPE

S = Relay SPDT 16A-AC1

R = Relay SPST-NO 16A-AC1

c : ALARM OUTPUT

R = Relay

- = None

d : INTERNAL BUZZER

B = Yes

- = No

ee : SPECIAL CODES

IWM STANDARD SPARES LIST

2004

ITEM DESCRIPTION GENERAL SPARES LIST	IWM ORDER REF	PRICE	UNIT
CHAIN PRODUCTS FOR S/S 1 PITCH CHAIN			
S/S 1" PITCH ROLLER CONVEYOR CHAIN	IWM-2040-01	£8.45	P/FT
S/S 1" CHAIN PITCH PUSHER ATTACHMENT	IWM-M10-02	£6.95	E/A
S/S STRAIGHT CHAIN LINK FOR 1"CHAIN	IWM-S/LIN-03	£4.95	E/A
S/S SPROCKETS TO SUIT ABOVE (PLAIN BORE)	IWM-2040-SPRO-01	£47.00	E/A
S/S SPROCKETS TO SUIT 1.5MM BORE	IWM-2040-SPRO-02	£47.00	E/A
CHAIN PRODUCTS FOR S/S 1 1/4 PITCH CHAIN			
S/S 1 1/4 PITCH ROLLER CHAIN HEAVY DUTY TYPE	IWM-S/S-2050-02	£9.95	P/FT
S/S CHAIN PITCH PUSHER ATTACHMENT	IWM - M10- 2050-S/L-04	£8.50	E/A
S/S STRAIGHT CHAIN LINK FOR HEAVY DUTY CHAIN	IWM - M10- 2050-S/L-05	£5.75	E/A
S/S SPROCKETS TO SUIT ABOVE (PLAIN BORE)	IWM-S/S-SPROC TO SUIT	£55.00	E/A
PLEASE CONFIRM BORE SIZE REQUIRED			
S/S STRAIGHT HEAVY DUTY CHAIN LINK	IWM - M10- 2050-S/L-04	£5.75	E/A
DRIVE SHAFT AND COMPONENTS			
1 INCH DIA DRIVE SHAFT	IWM-SHAFT- 1 INCH DIA	£165.00	E/A
1.5 DIA DRIVE SHAFT	IWM-SHAFT-1.5 INCH DIA	£195.00	E/A
2 INCH DIA DRIVE SHAFT	IWM-SHAFT-2.0 INCH DIA	£265.00	E/A
OIL LITE BUSH TO SUIT ABOVE SHAFT SIZES	IWM-OIL-L-BUSH 03	£8.20	E/A
PLASTIC CHAIN WEARSTRIPS			
TOP WEARSTRIP TO SUIT 1 INCH PITCH CHAIN	IWM-TOPW/S 22	£17.50	P/M
BOTTOM WEARSTRIP TO SUIT ABOVE	IWM-BOTTWS 23	£14.95	P/M
TOP WEARSTRIP TO SUIT 1 1/4 INCH PITCH CHAIN	IWM-TOPW/S-HD-24	£18.95	P/M
BOTTOM WEARSTRIP TO SUIT ABOVE	IWM-BOTTW/S-HD-25	£19.50	P/M
OTHER MISCELLANEOUS PLASTIC ITEMS			
NYLON CHAIN GUIDE REELS	IWMCRE-09	£11.50	E/A
PLASTIC SHAFT COLLORS	IWMPLAS/COLL-10	£4.50	E/A
S/S SHAFT COLLORS	IWMS/S/COLL-12	£8.95	E/A
BLACK LID AND DOOR HANDLES	IWM-BLA-41	4.85	E/A

IWM STANDARD SPARES LIST

2004

<u>MACHINE WASH NOZZLES AS STANDARD</u>			
YELLOW BASES 1/4 BSP	IWMBOD-12	£2.50	E/A
BLUE TIPS 2040	IWMBLUE-13	£1.80	E/A
YELLOW TIPS 4010	IWMYELL-14	£1.80	E/A
TAN TIPS 4030	IWMTAN-15	£1.80	E/A
GREEN TIPS ZF65015	IWMGREE-16	£2.95	E/A
GREEN TIPS ZF2505	IWMGREE-17	£2.95	E/A
<u>STAINLESS STEEL WASH NOZZLES</u>			
S/S ALTERNATIVE 4010 1/4 BSP	IWM-S/S 1385	£3.92	E/A
S/S ALTERNATIVE 4020 1/4 BSP	IWM-S/S 1780	£3.92	E/A
S/S 1/8 THREAD S/S FINE MIST NOZZLE	IWM-1/8 F/M SAN.	£7.95	E/A
S/S FULL BAYNET TYPE NOZZLE COMPLETE	IWM-ZHS DO25 B3V	£16.95	E/A
RE-PLACEMENT TIPS FOR THE ABOVE	IWM- HTV 1780 B3D	£6.30	E/A
RE-PLACEMENT SEALS FOR THE ABOVE	IWM-VDH 0028 E7	£1.65	E/A
<u>PLASTIC RINSE NOZZLES</u>			
RED RINSE NOZZLES 1/4 BSP	IWM RED-16	£2.70	E/A
BROWN RINSE NOZZLES 1/4 BSP	IWM BR0-18	£2.70	E/A
ORANGE RINSE 1/8 BSP	IWM ORA-19	£2.70	E/A
<i>IWM CAN SUPPLY ALL TYPES OF NOZZLES FOR ALL APPLICATIONS - PLSE CALL WITH YOUR ENQUIRY</i>			
<u>PUMPS AND RE-PLACEMENT SEALS</u>			
22MM VITON SEAL COMPLETE	IWM -P-SEAL-44	£48.50	E/A
28MM VITON SEAL COMPLETE	IWM - P-SEAL 45	£48.50	E/A
SHS 40 160 30	IWM SHS -30	£695.00	E/A
SHS 40 160 40	IWM SHS -40	£720.00	E/A
SHS 40 200 75	IWM SHS - 55	£985.00	E/A
SHS 40 200 55	IWM SHS - 75	£820.00	E/A
SHS 40 250 110	IWM-SHS-110-25	£1 279.95	E/A
SHS 40 200 110	IWM-SHS-110	£1 279.95	E/A
RINSE PUMP	IWM CEA-01	£245.00	E/A
<i>WE CAN SUPPLY OTHER MODELS BY REQUEST</i>			

IWM STANDARD SPARES LIST

2004

<u>S/S C SECTION FOR CHAIN GUIDES</u>			
FOR HOUSING PLASTIC WEAR STRIP	IWM-S/S-C-S 24	£11.20	P/M
<u>EXTRACTION AND BLOWER FAN UNITS AND PARTS</u>			
10 INCH DIA FULL S/S EXTRACT FAN	IWM-10-S/S-51	£825.00	E/A
12 INCH DIA FULL S/S EXTRACT FAN	IWM-12 S/S-52	£925.00	E/A
S/S IMPELORS FOR THE ABOVE UNITS	IWM-E/IMP-53	£230.00	E/A
BLOWER FAN UNIT	IWM-B/FAN-BC2-54	£1 300.00	E/A
<u>DOSING AND SANATISER UNITS</u>			
BT H/FLOW UNIT 6	IWM-DOS-64	£395.00	E/A
SANATISER UNIT	IWM-SAN-46	£345.00	E/A
PRESSURE RELIEF VALVE FOR SAN 46	IWM-PRV-45	£45.00	E/A
<u>DOSING UNIT SPARES</u>			
BT3 PUMP HEAD	IWM-BT3-P/H-59	£16.00	E/A
BT3 GEARBOX MOTOR	IWM-BT3-G/BM-60	£41.00	E/A
CONDUCTIVITY PROBE	IWM-BT3-BTCP-61	£16.50	E/A
POWER BOARD	IWM-BT3-PB-62	£59.00	E/A
MICROBOARD	IWM-BT3-M/B-63	£86.00	E/A
POWER BOARD FOR BT6	IWM-BT6-P/B/64	£135.00	E/A
RE-PLACEMENT INTERNAL HOSE FOR BT6	IWM-BT6-H-65	£18.50	PK/2
<u>STEAM SUPPLIES</u>			
STEAM WATER MIXING VALVE	IWM-S/MIX-47	£450.00	E/A
STEAM PROBE 1" BSP SUPPLY	IWM-SP-48	£540.00	E/A
STEAM INJECTORS 4 - 5.5 BAR	IWM-SI-49	£135.00	E/A
<u>SOLONOID VALVES</u>			
1/2 BSP VALVE	IWM-1/2 S/V-001	£52.00	E/A
3/4 BSP VALVE	IWM-3/4 S/V-002	£74.00	E/A
1" BSP VALVE FOR WATER	IWM-6213A	£225.00	E/A
1" BSP VALVE FOR STEAM	IWM-021620T	£265.00	E/A
<u>COILS ONLY FOR THE ABOVE</u>			
1/2 BSP VALVE	IWM 1/2 V/COIL	£34.00	E/A
3/4 BSP VALVE	IWM 3/4 V/COIL	£42.00	E/A

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1 BSP VALVE COIL FOR STEAM	IWM 1 INCH COIL	£55.00	E/A
1 BSP VALVE COIL FOR WATER	IWM 1 INCH COIL	£58.00	E/A
<u>RE-PLACEMENT FILTERS</u>			
COMPLETE M/C FILTERS	IWM-4-FILT-57	£130.00	E/A
<i>PLEASE CONFIRM MEASUREMENTS BEFORE ORDERING</i>			
<u>M/C BEARINGS</u>			
1" SQUARE BEARING	IWM-1-BEA-25	£17.50	E/A
AJUSTABLE 1 " BEARING	IWM-BT-26	£39.50	E/A
CARRIER HOUSING	IWM-BTH-27	£21.00	E/A
1.5" SQUARE BEARING	IWM-1.5-SQ-28	£28.50	E/A
2.0" SQUARE BEARING	IWM-2-S-B	£38.00	E/A
1 1/2 BORE AJUSTABLE BEARINGS	IWM-1.5 A/BEARINGS	£55.00	E/A
S/S CARRIER HOUSINGS	IWM-CHREF BT	£45.00	E/A
<u>TANK ITEMS</u>			
FLOAT SWITCH	IWM-F-S-28	£19.00	E/A
S/S FLOAT SWITCH	IWM-F-S-S/S-29	£55.00	E/A
BALL VALVE 3/4 CONNECTION	IWM-B-V-34	£16.95	E/A
BALL VALVE 1/2 CONNECTION	IWM-B-V-35	£19.50	E/A
1 1/4 DRAIN VALVE	IWM-D-V-01	£14.00	E/A
1 1/2 DRAIN VALVE	IWM-D-V-02	£14.95	E/A
2" DRAIN VALVE	IWM-D-V-03	£17.50	E/A
<u>ELECTRIC HEATERS</u>			
12 KW HEATING ELEMENT	IWM-12KW-29	£146.00	E/A
9 KW HEATING ELEMENT	IWM-9-KW-30	£146.00	E/A
<i>IWM CAN SUPPLY ALL TYPES OF ELEMENTS BY REQUEST</i>			
<u>PLATE COILS</u>			
300 X 450 LONG COIL	IWM-P-COIL-34	£150.00	E/A
900 X 450 LONG COILS	IWM-P-COIL-35	£285.00	E/A
1300 X 300 LONG COILS	IWM-P-COIL-36	£285.00	E/A

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<u>ELECTRICAL ITEMS</u>			
EMERGENCY STOP UNIT IN PLASTIC	IWM-E-STOP-35	£19.87	E/A
EMERGENCY STOP UNIT IN S/S	IWM-E-STOP-S/S-36	£55.00	E/A
DOORGUARD	IWM-D-S-36	£60.75	E/A
DIGITAL DISPLAY	IWM-STA-37	£74.00	E/A
PROBE KIT FOR ABOVE	IWM-DSTA-38	£19.85	E/A
PANEL ISOLATOR SWITCH FRONT PART ONLY	IWM-D-IS-S-02	£35.00	E/A
COMPLETE ISOLATOR	IWM-C-IS-03	£165.00	E/A
<i>WE CARRY ALL TYPES OF PANEL SPARES PLEASE CALL THE SPARES DEPT WITH ANY ENQUIRES</i>			
<u>GEARBOXES</u>			
CRUSADER 100 RE-PLACEMENT DRIVE	IWM-100-G-42	£430.00	E/A
CRUSADER 600 RE-PLACEMENT DRIVE	IWM-600-G-43	£495.00	E/A
CRUSADER ROTARY FILTER DRIVE	IWM-ROTF-44	£375.00	E/A
SANATISER 100 DRIVE	IWM-SAN-45	£495.00	E/A
BIN LIFTER DRIVE UNIT	IWM-BIN-L-47	£595.00	E/A
DOOR DRIVE GEARBOXES	IWM-D-OO-48	£420.00	E/A
<u>MACHINE FEET</u>			
150MM LONG S/S FEET	IWM-FE-06	£12.00	E/A
230MM LONG S/S FEET	IWM-FE-07	£16.00	E/A
<u>MISCELLANEOUS</u>			
PLASTIC HANDLES	IWM-P/H-04	£3.95	E/A
S/S DOOR CATCHES	IWM-D-C-05	£14.50	E/A
<u>DELIVERY</u>			
NEXT DAY DELIVERY UP TO 30 KG @		£16.95	E/A
ALSO SAME DAY BY REQUEST		POA	
<p><i>MOST ITEMS EX STOCK BUT PLEASE NOTE THAT TAILOR MADE SPARES PACKAGES ARE AVAILABLE TO SUIT EACH MACHINE PLEASE ASK FOR DETAILS</i></p>			