# **Engineers** manual

Under counter machines



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## 1. Introduction

Prior to reading this manual it is essential that you are familiar with the contents and subject matter covered by the "*Installation and Operation manual*".

#### 1.1 Installation and commissioning

Installation and commissioning instructions are detailed in the "*Installation and Operation manual*" and should always be followed. Incorrect installation may invalidate any warranties.

#### 1.2 Service and repairs

Repairs to the machine should only be carried out by a *Classeq* approved/trained technician using genuine *Classeq* parts. Failure to do so may invalidate any warranties.

#### 1.3 Modification

*Classeq* reserves the right to modify the machine or the contents of this manual without notice.

## 2. Explanation of symbols used

DANGER!	Warning against potentially serious or fatal injuries to persons if the described precautionary measures are not taken.	►	This symbol refers to a chapter with more detailed information
Warning!	Warning against potentially minor injuries to persons or material damage if the described precautionary measures are not taken	1	Refer to foot note at bottom of page
Caution	Warning against defects in or destruction of the product if the described precautionary measures are not taken.		Recycle

## 3. Warning and safety information

## 3.1 Danger warnings

Unless the machine has been isolated from the supply there will always be potential for mains voltage to any components in the machine. ( $\triangleright$ 8)

## 3.2 Warnings

**DO NOT** run the machine if there is no salt in the salt reservoir, as this will allow lime scale to build up, also any lime scale will invalidate your warranty.

**DO NOT** add any chemicals, such as detergent or rinse aid to the reservoir. These will cause damage to the machine. ( $\triangleright$ 7.5)

## 3.3 Cautions

**Only use granulated salt** (max. grain size 5 – 7 mm). Salt tablets are not suitable.

If the reservoir cap is not properly secured, water and/or chemicals can leak in or out of the unit causing damage to the machine. ( $\triangleright$ 7.5)

Repairs to the machine should only be done with the mains supply isolated. (▶8)

Any changes made to P∃□ will not be saved if power to the machine is disrupted before completely exiting service mode. (►8.2)



## 4. Machine specifications

## 4.1 Systems matrix

Below is a table describing the various systems available for the different machine types.

Machine type	13A (11A <sup>1</sup> )	28A	3 Phase	Rinse booster pump	WRAS approved air gap	Water softener	Drain pump	Gravity drain
90000287 <sup>2</sup>	•	$\bigcirc$	0	0	0	0	lacksquare	
90000288 <sup>3</sup>	•	$\bigcirc$	$\bigcirc$	0	0	0	lacksquare	
90000289 <sup>4</sup>	$\mathbf{O}$		${\color{black}\bullet}$			igodot		lacksquare
90000290 <sup>5</sup>	igodot		$\bullet$	0	0	0		lacksquare
90000291 <sup>6</sup>	$\bigcirc$		${\rm I}$			${\rm O}$		$\bigcirc$

## • Standard

- Optional
- $\bigcirc$  Not available

## 4.2 Mechanical specifications and site requirements

For details on machine dimensions and site requirements refer to the "*Installation and Operation manual*" for the machine.

## 4.3 Wiring

For detailed wiring information refer to the relevant wiring diagram for the machine.

<sup>&</sup>lt;sup>1</sup> In machines with this as an option only 1 leg of the 6kW rinse element will be used.

<sup>&</sup>lt;sup>2</sup> G350

<sup>&</sup>lt;sup>3</sup> G400; D400

<sup>&</sup>lt;sup>4</sup> G400 DUO, D400 DUO, G400 DUO WS; D400 DUO WS

<sup>&</sup>lt;sup>5</sup> G500; D500

<sup>&</sup>lt;sup>6</sup> G500 DUO; D500DUO; G500DUO WS; D500 DUO WS



#### 4.4 Components

The table below indicates the electrical components in the machines and their electrical specifications

Comp	onent	Voltage range (V)	Frequency (Hz)	Current (A)	Power (W)	Resistance (Ω)
Inlet solenoid		220-240	50/60	0.026	6	4110
Rinse	2600	220.240	50/60	5.65	2 x 1300	41.95
element	6000	220-240	50/60	8.68	3 x 2000	27.25
		220.240	50	0.45	100	M – 41.9
	Small <sup>7</sup>	220-240	50	0.45	100	A – 67.6
	Small	220.240	60	0.47	105	M – 39
		220-240	60	0.47	105	A – 56
Rinse pump		220.240	50	0.7	100	M – 32.2
	Lorgo	220-240	50	0.7	190	A – 43.3
	Large	220.240	60	0.66	146	M – 26.78
		220-240			140	A – 34.8
Wash elemer	it	220-240	50/60	8.7	2000	27.3
	Small	220.240	50	1 0	250	M – 22.76
		220-240	50	1.2	230	A – 54.1
		220.240	60	1.05	255	M – 17.3
		220-240	60	1.20	200	A – 42.1
wash pump		220.240	50	2.55	E90	M – 9.52
	L orgo <sup>8</sup>	220-240	50		560	A – 18.97
	Large	220.240		0.40	EEO	M – 8.06
		220-240	60	2.42	550	A – 16.11
Drain pump		220-240	50	0.2	30	145.1
		208-240	60	0.15	32	76
Contentore	1 Pole9	220-240	50/60	0.005	1.2	11030
Contactors	3 Pole <sup>10</sup>	220-240	50/60	0.006	1.3	6760
Detergent pu	mp	220-240	50/60	0.03	8	3180
Rinse aid pur	np	220-240	50/60	0.03	8	3180

 <sup>&</sup>lt;sup>7</sup> 400mm machines only
 <sup>8</sup> 500mm machines only
 <sup>9</sup> 2600W rinse element machines only
 <sup>10</sup> 6000W rinse element machines only



# 4.4.1 Pump wiring

The windings of the wash and rinse pumps are wired to the plug as below:



# 4.4.2 Winding legend

Key	Description
М	Main winding
А	Auxiliary winding
PE	Earth wire (Green and Yellow)
BU	Blue wire
BK	Black wire



# 5. Water paths

5.1 Pressurised system





# 5.2 Unpressurised system





# 5.3 Water softener system





## 5.4 Water softener unit





# 5.5 Water ways legend

Кеу	Description				
ISV	Inlet solenoid valve				
LCV	Lateral check valve				
AB	WRAS approved type AB air gap				
RB	Rinse tank				
RBP	Rinse booster pump				
WP	Wash pump				
DP	Drain pump				
RA	Rinse arm				
WA	Wash arm				
WSU	Water softener unit				
NRV	Non-return valve				
ASU	Anti-syphon unit				
SR	Salt reservoir				
Res	Resin chamber				
	Solenoid valve				
	Paddle sensor				
	Ball valve				
	Air gap				
	Switching valve				
	Non return ball valve				
BU ———	Incoming water				
GR	Softened water				
R	Rinse water				
0	Wash water				
GY	Waste water – Pumped drain				
GY	Waste water – Gravity drain				
P	Waste water – Water softener				
0	Breather				



# 6. Logic

## 6.1 Indicator logic



ltem	Description
1	Heating indicator
2	Cycle indicator

## 6.1.1 Heating indicator

This will illuminate **GREEN** only when following condition is achieved:

- Wash tank water level full
- Rinse tank water level full

If one of these has not been achieved the indicator will flash **AMBER** to indicate that the machine has not achieved these.

## 6.1.2 Cycle indicator

This will illuminate **BLUE** when a cycle has been requested. The cycle will then start when the above interlock requirements have been achieved.

This will also flash **BLUE** during the drain process.

In certain serious error conditions (►7.6.5) this indicator will illuminate **RED** and the machine will turn off.



#### 6.2 Fill and heat

## 6.2.1 Pressurised fill and heat

Pressurised machines fill and rinse using the solenoid valve and site water pressure. These machines will fill in the following manner:

- 1) Activate solenoid valve until the wash air pressure sensor reads a minimum level.
- 2) Heat the rinse tank to a specified transfer temperature; this is lower than the rinse temperature to ensure that the wash tank is not too hot after the fill cycle.
- 3) Activate the solenoid valve to transfer water through the rinse tank to the wash tank for a specified time.
- 4) Repeat steps 1 to 3 until the wash tank is full.
- 5) Once wash tank water level is achieved, **GREEN** lamp should illuminate.
- 6) In the background machine will continue to heat until the rinse boiler and wash tank have both reached the specified temperatures.

Below is a flow diagram to represent this.





## 6.2.2 Unpressurised fill and heat

Unpressurised (air gap) machines fill and rinse using a rinse booster pump; this means that the rinse is not reliant on the incoming water pressure. These machines fill in the following manner:

- 1) Activate solenoid valve to fill rinse tank.
- 2) When rinse tank has reached the minimum level it will start to heat to a specified transfer temperature; this is lower than the rinse temperature to ensure that the wash tank is not too hot after the fill cycle.
- 3) Activate the rinse booster pump to transfer water for a specified time.
- 4) Repeat steps 1 to 3 until the wash tank is full.
- 5) Once the wash tank has reached a minimum level this will begin to heat if required while the rinse tank is refilling.
- 6) On machines with water softeners fitted the machine will calculate the volume of water that has passed through the unit and activate the regeneration process (▶6.6) as required.
- 7) Once wash tank water level and Rinse tank water level is achieved, **GREEN** lamp will illuminate.
- 8) In the background machine will continue to heat until the rinse boiler and wash tank have both reached the specified temperatures.

Below is a flow diagram to represent this.





#### 6.3 Wash and rinse

If a cycle is requested when the machine is in standby the wash and rinse, process on all machines, follow the below procedure:

- 1) **BLUE** lamp is Illuminate on cycle indicator.
- 2) Starts the wash cycle with wash pump activated. Soft start runs i for first 6 seconds.
- 3) Once the wash tank and rinse tank has achieved the interlock temperature (P4 (HP5 I) and the wash time has elapsed, Wash pump will be deactivated. If the interlock temperature are not satisfied during wash cycle time than it will extend the wash cycle till it has achieved it.
- 4) There is a pause of <u>8 seconds</u> to allow the wash tank water to drip down back in wash tank.
- 5) Completes the rinse cycle for the specified time (P6D) with activation and deactivation of Rinse pump.
- 6) There is a short pause after the rinse to allow water to drip down then the Cycle indicator will turn off.

Below is a flow diagram to represent this.



Refer ( $\triangleright$ 7.6.1) & ( $\triangleright$ 7.6.2) for more information on Parameters P4 (& P5 ) and interlock options. Please note if condition for either P4 (or P5 ) not met during specific wash cycle time than it will extend the wash cycle time till it satisfies the conditions.



## 6.4 Drain

The drain of the machine functions in two ways:

- 1. It monitors the water level in the wash tank and drains away any excess water at any time.
- 2. If the machine is turned off and the drain cycle is selected, this function will follow the below process:
  - a. Start draining the machine. **BLUE** lamp <u>flashes</u> to indicate drain cycle.
  - b. Once the water reaches the minimum level in the wash tank an "Assisted clean" function will transfer water from the rinse boiler in the same fashion as it fills (►6.2) while continuing to drain (If the door is open at this time the "Assisted clean" will be cancelled).
  - c. Once the wash tank reaches a minimum level again it activates a timer to drain out the remaining water.

Below is a flow diagram to represent this.





#### 6.5 Chemical dosing

The machine doses chemical at two different stages:

- 1. While filling the machine:
  - a. The detergent is dosed into the wash tank with each transfer. At the end of the fill the rinse aid is dosed into the rinse tank.
- 2. While cycling the machine:
  - a. When a cycle is selected the detergent will dose into the wash tank. This will not occur on the first cycle after filling the machine.
  - b. After each cycle the rinse aid is dosed into the rinse boiler for the amount of water used.

#### 6.6 Water softener unit

On machines with the integral water softener fitted the machine will monitor the amount of water passing through the resin of the softener unit and regenerate at intervals required by the water hardness setting (>7.5.3).

The regeneration process passes salt water into the resin, allows a contact period for the salt to 'scrub' the resin then flushes this salt water out the waste.

Re-fill salt indicator will flash to indicate water softener needs salt re-filling. Refer (>3.3) for Salt specification and unit installation and operation manual for more information.

Below is the timing for this function of the water softener unit.

Function	Rinse until resin exhausted	Pause	Salt to resin	Pause	Pressurise	Regen (Contact)	Pause	Flush	Pause
Time		3s	25s	3s	1.5s	20s	3s	20s	3s
ISV (O8)									
WS salt valve (O11)									
WS waste valve (O12)									



## 7. Commissioning/service modes

## 7.1 Commissioning/service interface



6 Down button

#### 7.2 Commissioning mode

With the machine turned on at the mains electrical supply but off at the display, press and hold the Exit (1) and Enter (2) buttons for 3sec. the DISPLAY (4) will show the first menu item and the cycle indicator (3) will illuminate red.

If no buttons have been pressed for a period of time the machine will cancel this mode and return to the off state.

Below is the complete menu list.

Display	Description	Units
۲**	Rinse aid setting (e.g. 15 = 1.5ml/L)	0.1 X ml/L
- P0	Rinse aid prime	0 = Off { = On
ď**	Detergent setting (e.g. 33 = 3.3ml/L)	0.1 X ml/L
dPC	Detergent prime	0 = Off { = On
h**	Water softener setting (if fitted)	°dH

\*\* Refers to the setting of the chemical dosing. For example the default setting for rinse aid is 0.5ml of chemical per litre of water this will be displayed as 'r  $\Box$ 5' the default setting for detergent is 3ml of chemical per litre of water this will be displayed as 'd3 $\Box$ '



## 7.3 Setting chemical dosage

- 1. Enter commissioning mode ( $\triangleright$ 7.2).
- 2. Using the UP and DOWN keys (5 & 6), scroll to the rinse aid setting menu item (r\*\*) and press ENTER (2).
- 3. The display will flash.
- 4. Use the UP and DOWN keys (5 & 6) to scroll to the required setting and press ENTER (2).
- 5. Using the UP and DOWN keys (5 & 6), scroll to the detergent setting menu item (d\*\*) and press ENTER (2).
- 6. The display will flash.
- 7. Use the UP and DOWN keys (5 & 6) to scroll to the required setting and press ENTER (2).
- 8. Press EXIT (1) until you are out of commissioning mode.

## 7.4 **Priming chemicals**

Before the machine can be used the chemical tubes will need to be filled with chemicals, in order to do this you will need to follow the below instructions to prime the chemical pumps.

- 1. Enter commissioning mode (►7.2).
- 2. Using the UP and DOWN keys (5 & 6), scroll to the rinse aid prime menu item (¬P□) and press ENTER (2)
- 3. The display will flash and will change to rP .
- 4. This will continually run the rinse aid pump for a maximum of 12 minutes and draw chemicals into the machine. When the chemicals have reached the back of the machine press ENTER (2) again to stop the pump.
- 5. The display will stop flashing and return to  $-P_{\Box}$ .
- 6. Using the UP and DOWN keys (5 & 6), scroll to the detergent prime menu item (dPI) and press ENTER (2)
- 7. The display will flash and will change to dP i.
- 8. This will continually run the detergent pump for a maximum of 2 minutes and draw chemicals into the machine. When the chemicals have reached the back of the machine press ENTER (2) again to stop the pump.
- 9. The display will stop flashing and return to dPI.
- 10. Press EXIT (1) until you are out of commissioning mode.

## 7.5 Integral water softener (if fitted)

## 7.5.1 Commissioning the water softener unit

To commission the water softener unit follow the instructions below:

- 1. Open the door to the machine.
- 2. Remove the right hand basket ramp.
- 3. Open the salt reservoir cap at the back right hand corner of the wash tank.
- 4. Fill the reservoir with fresh water.
- 5. Using the salt funnel supplied fill the reservoir with approximately 1.5kg of granulated salt.
- 6. Wipe away any excess or spilt salt from the cabinet and the reservoir opening.
- 7. Refit the cap to the reservoir, ensure that the cap is fitted flat and secure.





**DO NOT** run the machine if there is no salt in the salt reservoir, as this will allow lime scale to build up, also any lime scale will invalidate your warranty.

**DO NOT** add any chemicals, such as detergent or rinse aid to the reservoir. These will cause damage to the machine.



**Only use granulated salt** (max. grain size 5 – 7 mm). Salt tablets are not suitable.

If the reservoir cap in not properly secured, water and/or chemicals can leak in or out of the unit causing damage to the machine.

## 7.5.2 Setting the water softener

Check the water hardness of your water supply (°d). Once you have this data follow the steps below.

- 1. Refer to Appendix A to find the setting required for your water hardness (>7.5.3).
- 2. Enter commissioning mode (►7.2)
- 3. Using the UP and DOWN keys (5 & 6), scroll to the water hardness menu item (h\*\*) and press ENTER (2).
- 4. The display will flash.
- 5. Use the UP and DOWN keys (5 & 6) to scroll to the setting you require and press ENTER (2).
- 6. Press EXIT (1) until you are out of commissioning mode.

Water softener setting	°dH	°e / °clark	°fH	ppm	Water volume	No of cycles
h00	ь00 De					
h0∣	1	1.3	1.8	18	48.1 L	16
h02	2	2.5	3.6	36	45.7 L	15
h03	3	3.8	5.4	54	43.4 L	14
h04	4	5.0	7.2	71	41.2 L	14
hOS	5	6.3	9.0	89	39.0 L	13
h06	6	7.5	10.7	107	36.9 L	12
H07	7	8.8	12.5	125	34.9 L	12
h08	8	10.0	14.3	143	32.9 L	11
h09	9	11.3	16.1	161	31.0 L	10
h (1)	10	12.5	17.9	179	29.2 L	10
h[]	11	13.8	19.7	196	27.4 L	9
h (2	12	15.0	21.5	214	25.7 L	9
h (3	13	16.3	23.3	232	24.1 L	8
h (4	14	17.5	25.1	250	22.5 L	7
h (5	15	18.8	26.9	268	21.0 L	7
h 16	16	20.0	28.6	286	19.5 L	7
h []	17	21.3	30.4	303	18.2 L	6
h (8	18	22.5	32.2	321	16.9 L	6
h (9	19	23.8	34.0	339	15.9 L	5
h20	20	25.0	35.8	357	14.4 L	5
h2 (	21	26.3	37.6	375	13.3 L	4
h22	22	27.5	39.4	393	12.3 L	4
h23	23	28.8	41.2	411	11.3 L	4
h24	24	30.0	43.0	428	10.4 L	3
h25	25	31.3	44.8	446	9.6 L	3
h26	26	32.5	46.5	464	8.8 L	3
h27	27	33.8	48.3	482	8.1 L	3
h28	28	35.0	50.1	500	7.4 L	2
h29	29	36.3	51.9	518	6.8 L	2
h30	30	37.5	53.7	536	6.3 L	2

#### 7.5.3 Water softener settings



#### 7.6 Service mode

With the machine turned on at the mains electrical supply but off at the display, press and hold the Exit (1) and Enter (2) buttons for 6sec. the DISPLAY (4) will show the first menu item and the cycle indicator (3) will illuminate red.

If no buttons have been pressed for a period of time the machine will cancel this mode and return to the off state.

Below is the complete menu list.

Display	Description
P	Program values
L	Loads
Ε	Errors
5	Statistics

#### 7.6.1 Program value

The program values menu feeds back the reading that the sensors are receiving at the given time. Below is a list of the program values available. Below is a list of Programmes that can be activated, via the UP and DOWN keys (**5** & **6**). To select particular programme press ENTER (**2**)

Display	Description	Value
P0 (	Display wash temperature	***
P02	Display wash level	***
P03	Display rinse temperature	***
P04	Display rinse level	***
POS	Display water flow rate (e.g. 닉급 = 4.0L/min)	dl/min
P06	Display salt float switch status	☐ = Full ∜ = Empty
P 10	Display door switch status	☐ = Open ∜ = Closed
P30	Display model type	****
PYC	Wash tank target temperature	°C
የч (	Wash tank Interlock temperature	°C
PSO	Rinse tank target temperature	°C
PS (	Rinse tank Interlock temperature	°C
P60	Rinse time	Sec

\*\*\* Refers to a value that will be displayed at the time of checking.

\*\*\*\* Refers to a specific model number ( $\triangleright$  8.2).

P입낙 will display '- - - 'on pressurised machines.

POS and POS will only display if an integral water softener is fitted.

P40, P4 ( P50 P5 ) and P60 have predetermined upper and lower limits. CLASSEQ recommends the default values are maintained for correct operation of the machine.

## 7.6.2 Product Interlock settings

Default machine setting is GREEN for faster recovery time. However if site required high hygienic and intense wash result then select the RED (Temperature based) option. During servicing the machine, if no Interlock is required then select the BLACK (No Interlock active) option.

Please remember to change back to the default settings after servicing.

Display	Description	GREEN (Default Setting)	BLACK (No Interlock)	RED (Full Interlock)	ORANGE (Wash Interlock)
P40	Wash tank target temperature	55°C	55°C	55°C	55°C
P4 (	Wash tank Interlock temperature	0°C	0°C	55°C	55°C
PS0	Rinse tank target temperature	82°C	82°C	82°C	82°C
P5 (	Rinse tank Interlock temperature	55°C	0°C	82°C	0°C

Range		Logic
PYC	30°C to 75°C	<b>D</b> 11 < D10
PY (	30°C to P40 value °C	<b>F4I</b> ≥ F40
PS0	55°C to 85°C	<b>DE1</b> < D50
PS (	55°C to P50 value °C	<b>F31</b> \$ P50
Note		
PY (	0°C = Wash Tank Interlock temp	perature OFF
PS (	0°C = Rinse Tank Interlock temp	perature OFF



#### 7.6.3 Re-set to Factory settings

- 1) Go to Parameter P3C (Display model type) and note down the Number.
- 2) Change to different number by scrolling UP and DOWN key (5 & 6).
- 3) Press ENTER (2) to select new P30 value.
- 4) Press EXIT (1) Button to come out of the service mode.
- 5) Go back to Parameter P30 and change the value back to noted Number on STEP 1.
- 6) Press ENTER (2) button to select the value.
- 7) Press EXIT (1) button to come out of the service mode.

MACHINE BASE SETS		
P30	Model	
1	G350	
2	G400	
3	G400 DUO	
4	G400 DUO WS	
5	D400	
6	D400 DUO	
7	D400 DUO WS	
8	G500	
9	G500 DUO	
10	G500 DUO WS	
11	D500	
12	D500 DUO	
13	D500 DUO WS	



Any changes made to P3D will not be saved if power to the machine is disrupted before completely exiting service mode.

#### 7.6.4 Loads

The loads menu allows activation of specific loads within the machine in order to test their function. Some loads have safety criteria that need to be achieved before the load can be activated, if the component does not activate when the load is activated first check the continuity or resistance of the component through the harness.

Below is a list of loads that can be activated, via the UP and DOWN keys (5 & 6), and their required criteria. Each of the loads has a safety timeout applied to reduce the risk of wear on the components.

Display	Description	Value	Safety criteria
LOO	Wash pump	□ = Off 1 = On	Wash water level above minimum level and door closed.
L0	Wash pump + soft start	☐ = Off { = On	Wash water level above minimum level and door closed.
L02	Wash tank heat element	☐ = Off { = On	Wash water level above minimum level.
L03	Detergent pump	□ = Off { = On	
LOY	Rinse pump	☐ = Off { = On	
LOS	Rinse aid pump	i = Off i = On	
L06	Wash tank heat element - Spare	☐ = Off { = On	Wash water level above minimum level.
L07	Rinse tank heat element	□ = Off ℓ = On	Rinse water level above minimum level and door closed.
L08	Inlet solenoid valve	□ = Off { = On	
L09	Drain pump	□ = Off { = On	
LII	WS Salt valve	☐ = Off { = On	
L 12	WS Waste valve	☐ = Off { = On	
L 13	WS Waste valve + inlet valve	☐ = Off { = On	

L<sup>[]</sup>Y will display '- - - 'on pressurised machines.

L 1 and L 12 will display if an integral water softener is fitted.

#### 7.6.5 Errors

The errors menu feeds back the last 40 errors on the machine in order to help identify the fault. Use the UP (5) and DOWN (6) keys to cycle through the list, the list does not roll over and will always start on the most recent error.

Below is a list of error codes and their <u>possible</u> cause. These are given as an aid only; all other possible causes of faults should be investigated before repair is carried out.

#### Errors E01,03,12,13,18,19 are displayed on the facia when the fault is active.



Display	Title	Description	Possible cause
000	New day	Displays each time the machine is switched on.	
E0 (	Wash tank pressure sensor	Invalid signal from the wash pressure sensor.	Wash tank pressure sensor faulty or disconnected.
203	Wash tank temperature sensor	Invalid signal from the wash temperature sensor.	Wash tank temperature sensor faulty.
E03	Rinse tank pressure sensor	Invalid signal from the rinse pressure sensor.	Rinse tank pressure sensor faulty or disconnected.
EOY	Rinse tank temperature sensor	Invalid signal from the rinse temperature sensor.	Rinse tank temperature sensor faulty.
E05	Wash water level unchanged during cycle.	Wash tank level not changed after soft start, repeated 3 times before error logged.	Wash pump blocked. Wash arm blocked. Wash pump capacitor failed. Wash pump failed. Board output relay failed.
E06	Rinse water level unchanged during rinse.	Rinse tank level not changed when starting the rinse pump.	Rinse arm blocked. Rinse pump blocked. Rinse pump capacitor failed. Rinse pump failed. Board output relay failed.
EDJ	Rinse tank temperature not achieved.	Rinse tank has not reached the target temperature within 60 minutes.	Rinse tank over heat thermostat tripped. Rinse tank heating element failed. Rinse tank element contactor failed. Board output relay failed.
E08	Wash tank temperature not achieved.	Wash tank has not reached the target temperature within 60 minutes.	Wash tank over heat thermostat tripped. Wash tank heating element failed. Board output relay failed.
E09	Wash water level unchanged during soft start.	Wash tank level not changed during soft start.	Wash pump blocked. Wash arm blocked. Wash pump capacitor failed. Wash pump failed. Board triac failed.
E 10	Salt missing	Only in machines with water softener fitted. Salt level in reservoir is low for 30 seconds.	No salt in reservoir. Salt reed switch failed.
E [ ]	Display communication failure	No signal from the user interface unit.	User interface not correctly connected. User interface failed.



E 12	Wash tank fill	Wash tank has not filled within the required number of transfers.	Drain plug not inserted. Machine leaking. Very low water pressure (pressurised machines).
E 13	Rinse tank fill timeout	Rinse tank has not filled within 5 minutes.	Water supply not connected or turned on. Very low water pressure. Solenoid valve failed.
E 14	Door switch	Door switch has not changed position for the past 20 cycles	Door switch failed.
E 15	Paddle flow sensor	Only in machines with water softener fitted. Paddle sensor in air gap is not responding during the fill stage.	No water supply. Paddle sensor failed. See PD5 to assist.
E 16	Wash tank overfill	Wash tank has reached the flood risk level.	Site drain blocked. Machine waste hose blocked or kinked. Solenoid failed open. Drain pump failed.
רו E	Filter mesh blocked	Water level in wash tank has been reduced to below minimum required level during a wash cycle.	Wash arms blocked. Wash pump blocked. Wash filters blocked. Container in wash tank collecting water.
E (8	Rinse tank temperature exceeded	Rinse tank temperature has exceeded the safety limit.	Rinse tank temperature sensor disconnected. Rinse element relay fused. Main board relay fused. Rinse element wired incorrectly.
E 19	Wash tank temperature exceeded	Wash tank temperature has exceeded the safety limit.	Wash tank temperature sensor disconnected. Main board relay fused. Wash element wired incorrectly.
620	Power interruption	Power to machine has been interrupted.	Machine isolated from power supply. Power failure.
1 53	EEPROM Error	EEPROM failed	Main board failed
523	Invalid machine type	Incorrect machine type set	Machine type 🛛 . Main board has not been configured.

Items in **BOLD** will cause the machine to enter error mode; this will turn off the machine and illuminate the cycle indicator (3) red.

E (2 - Number of cycles will differ depending on machine.

For E22 see "Board setup" (►8.2).



#### 7.6.6 Statistics

The statistics menu provides data on various aspects of the machine. Below is a list of the statistics that can be viewed.

Display	Description	Units
500	Total number of completed wash cycles	
50 (	Total run time (Power connected)	Hours
502	Total active time (Machine ON)	Hours
503	Total water usage	Litres
504	Drain pump failures	
520	Total number of regenerations	
52 (	Total number of cycles without salt	

On gravity drain machines 504 may be regularly triggered.

520 and 52 f are only active in machines with integral water softener fitted.



# 8. Control unit



Unless the machine has been isolated from the supply there will always be potential for mains voltage to any components in the machine.



Repairs to the machine should only be done with the mains supply isolated.

## 8.1 Inputs and outputs

#### 8.1.1 Main board



Inputs		
Label	Device	
1	Wash temperature sensor	
12	Wash pressure sensor	
13	Rinse temperature sensor	
14	Rinse pressure sensor	
15	Water softener float switch	
16	Water softener paddle wheel	
Bus	User interface	
Door	Door reed switch	
PC	Production test port	
LN	Mains power from terminal block	



Outputs		
Label	Load	
01	Wash pump	
O2	Wash element	
O3	Rinse aid pump	
O4	Rinse booster pump	
O5	Detergent pump	
O6	Aux. wash contactor	
07	Rinse contactor	
O8	Inlet solenoid valve	
O9	Drain pump	
O10	Not used	
O11	WS board	
012	WS board	
013	Not used	
I/O	WS board power	

# 8.1.2 Water softener board



Inputs		
Label	Device	
WS I1	Main board O11 and O12	
WS I/O	Power from main board	

Outputs		
Label	Load	
WS O1	Water softener salt valve	
WS O2	Water softener waste valve	



#### 8.2 Board setup

In the event of changing a control board the new board will need to be configured to the machine. The board will initially be set to Base set 2 and will give and error E22 and enter error mode if attempted to be turned on. In order to change the base set of the machine follow the instructions below:

Step	Instruction
1	Enter service mode (►7.6).
2	Enter the "Program values" menu.
3	Scroll to P3D using the UP and DOWN (5 and 6) keys and enter. The DISPLAY (4) will start to flash.
4	Use the UP and DOWN keys (5 and 6) to select the correct base set for the machine.
5	Press ENTER to select (2).
6	Press EXIT (1) until completely out of the service mode.

Base set	Description
1	G350
2	G400
3	G400 Duo
Ч	G400 Duo WS
5	D400
6	D400 Duo
7	D400 Duo WS
8	G500
9	G500 Duo
10	G500 Duo WS
11	D500
12	D500 Duo
13	D500 Duo WS



Any changes made to  $P \exists \Box$  will not be saved if power to the machine is disrupted before completely exiting service mode.

# 9. Cable Repair Kits

#### 9.1 Available Cable Kits list

Detailed below are the spares cable kits available for the machine:

Item	Description	Part number
1	KIT MACRO-MODULE PLUG SIZE 2,5 6-POLE	30002484
2	KIT MACRO-MODULE PLUG SIZE 2,5 5-POLE	30002483
3	KIT MACRO-MODULE PLUG SIZE 2,5 4-POLE	30002482
4	KIT MACRO-MODULE PLUG SIZE 2,5 3-POLE	30000198
5	KIT MACRO-MODULE PLUG SIZE 2,5 2-POLE	30000197
6	Module Plug (Size 5,0 / 4Pole) Type A	30014137
7	Module Plug (Size 5,0 / 4Pole) Type B	30014138
8	Module Plug (Size 5,0 / 6Pole)	30014140
9	ZSE Water Softener Harness Kit	30014124
10	MACRO-MODULE PLUG5, 5-POLE	3112091
11	Marco Module Plug5, 5Pole	30002002
12	6.0kW Element Wire Kit	30013685
13	2.6kW Element Wire Kit	30013686

#### 9.2 Cable Kit Information

Items 1-11 are to be used to repair any damaged connections on the control harness connecting to the main ZSE board or the internal components. The kit consists of a replacement connector with a length of cable connected to a terminal block. This allows the damaged connector to be removed and replaced easily. A reference diagram is shown in **'section 9.3'**.

Items 12-13 are available to repair the heating circuit in situations where the element crimps or wires have been damaged. Included in these kits are a full set of wires from the terminal block to the element.



# 9.3 Cable Kit Diagram



## 10. Tool list

The below list of tools will allow access to all components within the machine:

Tool group	Description
	5.5mm
Spanner/nut	7mm
runner/ratchet	8mm
	13mm
	2mm
Hex key	3mm
	4mm
Daci carow drivar	No. 2
	No. 3
	Ammeter (A)
Electrical testing	Capacitance meter (µF)
Electrical testing	Resistance meter ( $\Omega$ )
	Continuity (🕬)

# 11. Notes



# 12. Quick reference

Refer to Engineers manual 10021364 (UC) / 30013648 (PT) for further details	Image: Seconds condition       Image: Seconds condition       Image: Seconds condition       Image: Seconds condition         Image: Seconds conds       Image: Seconds condition       Image: Seconds condition       Image: Seconds condition	enu - Press and hold 3 seconds Service Service menu - Press and hold 6 seconds	Description Units Display Description	e, 15 = 1.5m/t) 0.1 x m/L		E. Brors 0.1 x m//	D = OH 1 = OH 2 Statistics	ing (if fitted) * 4H Changes ONLY saved when menu exited	eram values - P Errors - E (last 38 lozeed) Statistics - S	Decentration Value Dicelus Tribio Dicelus Dice	rature *** nnn New dav 800 Total number of completed wash ordes	*** E01 Wash fash mesure server S01 Total run time (Power connected) Hours	rature *** E02 Wash tank temperature sensor S02 Total active time (Machine ON) Hours	*** E03 Rinse tank pressure sensor S03 Total water usage Litres	ate (e.g., 40 = 4.0L/min) dL/min E04 Rine tank temperature sensor 504 Drain pump failures 504 Station pump failures	Itch status 1 = 0.1 E05 Wash water level unchanged during cycle. S20 Total number of regenerations	status 0 - Chen E06 Rinse water level unchanged during rinse. S21 Total number of cycles without salt	E07         Rinse tank temperature not achieved.         Machine base sets	ture °C E08 Wash tank temperature not achieved. Base set Description Type	*C         E09         Wash water level unchanged during soft start.         1         G350         UC	ture *C 2 E10 Salt missing 0 C 6400 UC	<ul> <li>*C 21 Display communication failure</li> <li>3 6400 uo</li> <li>UC</li> </ul>	Sec         E12         Wash tank fill         4         6400 Duo WS         UC	pressurised machines only         E13         Rinse tank fill timeout         D400         UC	Loads - 1         E14         Door switch         UC         6         D400 Duo         UC	Description         Value         E15         Paddle flow sensor         7         D400 Due WS         UC	000 E16 Wash tank overfill 8 G500 UC	start         0.00         E17         Filtermesh blocked         9         G500 Duo         UC	ment         1 = 0f 1 = 0f 1 = 0f         E18         Rinse tank temperature exceeded         10         G500 Duo WS         UC	0.001 1.001 1.001 1.001 1.000	1=0/1 E20 Power interruption 12 D500 Duo UC	1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ment - Spare 0 = 01 E22 Invalid machine type 100 P500 P500 PT	ment 0.00 A PT	102 P500-A5 PT	a contract of the machine will enter error mode: this will turn off the machine and illuminate 103 P500-A-WS PT	1 00 100 100 100 100 100 100 100 100 10	1	
	oress and hold for required time Commision Menu - 3 Seconds	nmissioning menu - Press and hold 3 seconds	Description	ie aid setting (e.g. 15 = 1.5mL/L)	se aid prime	tergent setting (e.g. 33 = 3.3mL/L)	stergent prime	(ater softener setting (if fitted)	Program values - P	Description	isplav wash temperature	isolav wash lavel	isplay rinse temperature	oisplay rinse level	Display water flow rate (e.g. 40 = 4.0L/min)	Display salt float switch status	Display door switch status	Display model type	Vash tank temperature	Vash tank Interlock	inse tank temperature	tinse tank Interlock	linse Time	BOLD - On unpressurised machines only	Loads - 1	Description	Wash pump	Wash pump + soft start	Vash tank heat element	Detergent pump	tinse pump	tinse aid pump	Vash tank heat element - Spare	Rinse tank heat element	Inlet solenoid valve	Drain pump	WS Salt valve	MX Matte valve	



## 13. Machine Rating

		3 Phase		
 RINSE ELEMENT	13A / 220- 240V / 1N~	20A / 220- 240V / 1N~	30A / 220- 240V / 1N~	13A per phase / 380-415V / 3N~
2.6 kW (30011828) 4 Legs	YES	NO	×0	NO
6.0 kW (30011827) 6 Legs	YES	YES	YES	YES

These diagrams are schematic references.









# 14. Wiring Diagrams







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4) 30012827 UC\_Standard\_230V 50/60Hz 3~\_No Neutral D400, G400, D400DUO, G400DUO, G500, D500, G500DUO & D500DUO





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